This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Field Museum of Natural History
LIBRARY
Chicago

From Strecker Collection

Class 446.09 Book C.16

Digitized by Google

SD
1
.C23

Digitized by Google

Digitized by Google

THE CANADIAN

ENTOMOLOGIST.

VOLUME XXV.

EDITED BY THE

Rev. C. J. S. Bethune, M. A., D. C. L.,

PORT HOPE, ONTARIO.

ASSISTED BY

J. Fletcher, Ottawa; H. H. Lyman, Montreal, and Rev. T. W. Fyles, Quebec.

London, Ont.:

LONDON PRINTING AND LITHOGRAPHING CO.

1893.

Digitized by Google

Digitized by Google

Fairchild
Zool
Field Museum
12-2-30

LIST OF CONTRIBUTORS TO THIS VOLUME.

AARON, DR. E. M.....NEW YORK.
ALDRICH, PROF. J. M.....BROOKINGS, SOUTH DAKOTA.
ASHMEAD, W. H.....WASHINGTON, D. C.
BANKS, NATHAN.....SEA CLIFF, N. Y.
BEAN, T. E.....LAGGAN, ALBERTA.
BETHUNE, REV. C. J. S. (The Editor).....PORT HOPE.
BLATCHLEY, W. S.....TERRE HAUTE, INDIANA.
COCKERELL, T. D. A.....LAS CRUCES, NEW MEXICO.
COQUILLETT, D. W.....LOS ANGELES, CAL.
DAVIS, W. T.....STATEN ISLAND, N. Y.
DYAR, HARRISON G.....NEW YORK.
EDWARDS, W. H.....COALBURGH, WEST VA.
EHRMANN, G. A.....PITTSBURGH, PA.
ELWES, W. J.....COLESBORNE, ENGLAND.
FELT, E. P.....ITHACA, N. Y.
FERNALD, PROF. C. H.....AMHERST, MASS.
FIELD, W. L. W.....GUILDFORD, CONN.
FLETCHER, JAMES.....OTTAWA.
FORD, A.....ST. LEONARDS, ENGLAND.
FOX, W. J.....PHILADELPHIA.
FRENCH, PROF. G. H.....CARBONDALE, ILL.
FYLES, REV. T. W.....SOUTH QUEBEC.
GIBB, LACHLAN.....MONTREAL.
GILLETTE, C. P.....FORT COLLINS, COLORADO.
GODING, DR. F. W.....RUTLAND, ILL.
GROTE, AUG. R.....BREMEN, GERMANY.
HAMILTON, DR. JOHN.....ALLEGHENY, PA.
HARRINGTON, W. H.....OTTAWA.
HART, CHARLES A.....CHAMPAIGN, ILL.
HOLLAND, REV. W. J.....PITTSBURGH, PA.
HOWARD, L. O.....WASHINGTON, D. C.
HUDSON, G. H.....PLATTSBURGH, N. Y.
JACK, J. G.....JAMAICA PLAIN, MASS.
KENYAN, F. C.....LINCOLN, NEB.
KIRKLAND, A. H.....AMHERST, MASS.
KUNZÉ, DR. R. E.....NEW YORK.
LEMBERT, J. B.....YO SEMITE, CAL.
LYMAN, H. H.....MONTREAL.
MACGILLIVRAY, A. D.....ITHACA, N. Y.
MOFFAT, J. ALSTON.....LONDON, ONT.
NEUMOEGEN, B.....NEW YORK.
PACKARD, DR. A. S.....PROVIDENCE, R. I.
PATTON, W. HAMPTON.....HARTFORD, CONN.
RIVERS, J. J.....BERKELEY, CAL.
SKINNER, DR. H.....PHILADELPHIA.
SLINGERLAND, M. W.....ITHACA, N. Y.
SLOSSON, MRS.....NEW YORK.
SMITH, DR. J. B.....NEW BRUNSWICK, N. J.
STRECKER, DR. H.....READING, PA.
TOWNSEND, C. H. TYLER.....KINGSTON, JAMAICA, W. I.
VAN DUZEE, E. P.....BUFFALO, N. Y.
VAN WINKLE, A. S.....KEOTA, IOWA.
WEBSTER, F. M.....WOOSTER, OHIO.
WICKHAM, H. F.....IOWA CITY, IOWA.
WILLISTON, PROF. S. W.....LAWRENCE, KANSAS.
WOLCOTT, R. H.....GRAND RAPIDS, MICH.

Digitized by Google

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, JANUARY, 1893. No. 1.

DESCRIPTIONS OF FOUR NEW WEST AFRICAN BUTTERFLIES.

BY W. J. HOLLAND, PH. D., PITTSBURGH, PA.

EURYPHENE, BOISD.

1. E. castanea, sp. nov.

♂. The form of the wings is exactly like that of *Senegalensis*, H.-S. UPPERSIDE.—The ground colour is rich chestnut-brown, marked by broad black series of spots and bands. Upon the primaries these markings are as follows :—In the cell a longitudinal basal streak, a transverse line, a figure 8, a twice curved transverse line, and a broad bar at the end of the cell constricted in the middle ; below the cell there is a short basal band curving inwardly ; beyond the cell there is a wide band running from the costa toward the outer margin as far as the lower radial, and then abruptly turning and extending to the middle of the inner margin ; beyond this is a broad band of diffuse spots, wide on the costa, narrower beyond the end of the cell, and gradually widening as it approaches the inner margin ; beyond this is a submarginal series of very black round spots. The outer margin is black. All of these lines are continued upon the secondaries parallel to the outer margin, and in addition there is a narrow, submarginal black line. In the cell of the secondaries there is a round spot at the base, a figure 8, and a constricted annular mark at the end. UNDERSIDE.—The prevalent colour on the underside of the wings is pale fuscous, shading into ashen grey upon the cells of both wings. The markings of the upper surface scarcely reappear upon the lower side, except the submarginal band of round spots, which reappear upon the primaries as faint blackish marks, and upon the secondaries as ocelli with pale ashen margins. In both wings there are in the cell a black basal dot, a figure 8, and a narrow constricted annular mark at the end. In addition, upon the primaries the costa near the base is white, and there are a couple of small white marks at the apex ; upon the secondaries there is a narrow white bar extending from near the middle of the costa to the first subcostal nervule.

Expanse 58 mm. Habitat Kangwé, Ogové Valley.

Digitized by Google

2. *E. suffumigata*, sp. nov.

♀. The form of the wings is like that of *E. eliensis*, Hew. UPPERSIDE.—Both wings are dark smoky-brown, shading into black at the apex of the primaries and clouded on the costa and cell of the primaries, with obscure black markings. There is a broad yellowish subapical band on the primaries, running from the costa and terminating before the outer margin above the third median nervule. Upon the secondaries there is a continuous slightly undulating dark brown submarginal line. UNDERSIDE.—The ground colour is light green, or glaucous. The costa of the primaries at the base, the apex, the costal portion of the subapical band of the primaries which reappears upon the lower side, and a narrow bar running from before the middle of the secondaries from the costal to the first subcostal, are all white. The outer half of the wings is suffused with a fuliginous shade defined inwardly by a curved line running from the outer margin of the primaries below the apex to the origin of the third median, and thence to the middle of the inner margin, across the secondaries beyond the end of the cell, sweeping inwardly from the origin of the third median to a point above the anal angle on the inner margin. Faint traces of a submarginal band of ocelli appear upon the secondaries. Body and legs concolorous.

Expanse 75 mm. Habitat Talaguga, Ogové Valley.

This noble and well-marked species is represented in my collection by a single specimen taken in the spring of the present year. It is likely to be confounded with *E. Phantasia*, Hew., from which it may, however, be at once distinguished by the absence of the broad blue submarginal band running from above the first median nervule on the primaries to the anal angle of the secondaries in the female.

ATERICA, BOISD.

3. *A. fuliginosa*, sp. nov.

♀. Antennæ black. Body above dark brown. Underside of palpi, thorax and abdomen light grey. UPPERSIDE.—The ground colour of the upper side of the wings is smoky-brown, shading into dark brown near the apex of the primaries. There is a series of four minute white spots extending from the costa before the apex to the third median nervule. A broad oblique subapical yellow band runs from the first subcostal nervule beyond the cell toward the outer margin, terminating upon the first median nervule. The inner margin of this band is moderately straight; the outer margin is irregular, being indented upon the lower radial and the second

Digitized by Google

median nervules. The usual markings appear obscurely in the cell. The posterior wings are ornamented by a submarginal band of obscure ocelli running parallel to the outer margin. These spots are lighter than the rest of the wing and ringed about with dark brown, and have in the centre dark brown subhastate pupils. UNDERSIDE.—The underside is obscurely brownish-grey. The markings of the upperside reappear, and on the underside of the secondaries the submarginal band of ocelli is indicated by a series of minute white spots located on the inner edge of each ocellus. There are seven of these minute white spots on each secondary. The base of the secondaries has a few obscure markings characteristic of the genus, the most prominent of which is an annular mark in the middle of the cell.

Expanse of wings 68 mm. Habitat Kangwé, Ogové Valley.

I hesitated to describe this species from the solitary ♀ specimen, but it is wholly unlike the female of any species known to me, and does not exist in any of the English collections which I have consulted, and was pronounced by Mons. Mabille, to whom I showed it, as undoubtedly a new species. It comes nearest to *A. aridatha*, of Hewitson, but it is totally distinct, being much larger and quite differently coloured, and the subapical band of the primaries having an altogether different form.

EUPHAEDRA, HUBN.

4. E. imitans, sp. nov.

♂. Very closely allied to *E. Eusemoides* recently described by Smith & Kirby, but readily distinguished from that species by the fact that the yellow spots on the middle of the primaries are not widely separated as in Eusemoides, and that the base of the primaries is adorned by a number of *blue spots*, and that along the inner margin of the primaries there is a *long yellow streak*. The secondaries have a *yellow spot on the base and three black spots in the cell*, and the broad black border is interrupted by a *marginal series of obscure geminate blue spots*. The underside has a spot at the base of the secondaries pupilled with yellow, in addition to the spots which appear upon the underside of *E. Eusemoides*.

♀. The female is like the male, but much larger, and the marginal blue spots upon the upperside of the secondaries are brighter and larger.

Expanse ♂, 58 mm.; ♀, 85 mm. Habitat Talaguga, Upper Valley of Ogové.

Represented in the collection of the author by two males and one female. It is a very close mimic of *Xanthospilopteryx longipennis*, and even more so of a species of this genus in the collection of the writer which has not yet been named.

Pittsburgh, Nov. 30, 1892.

Digitized by Google

SOME NEW ADDITIONS TO THE GENUS CLISIOCAMPA, CURT.

BY B. NEUMOEGEN, NEW YORK.

C. Mus, nov. spec.

♂. Head, palpi and thorax whitish gray. Antennae brown, with whitish stems. Abdomen gray, intermixed with black hair. Primaries dark gray, with veins indicated more or less by white. A broad blackish transverse band between two whitish lines, which are slightly toothed at intersections of veins. Basal space whitish, with black tings along costa. Fringes gray, with brown accentuations at terminus of subcostal and median veins. Secondaries dark chestnut-brown, fading into whitish tinges along anal margin and in basal space. A faint, whitish mesian line. Fringes gray and brown alternating.

Below. Primaries dark brown, dusted with gray in submarginal space and along costa. The outer transverse line well marked. Secondaries whitish gray. The mesian line well curved and prominent. Legs brownish-gray. In some specimens there is a shading from gray into light brown, and the white veins are less prominent on upper surface of primaries.

♀. Antennae, head and thorax whitish gray. In some specimens exceptionally blackish-brown. Abdomen whitish gray. Primaries dark gray. A broad, blackish transverse band enclosed in white transverse lines, slightly toothed at veins. The latter appear as white horizontal lines, in crossing this band. Basal space whitish. Fringes as in ♂. Secondaries of chestnut colour, fading in basal space, with black dashes, especially along costa. Fringes alternately brown and gray.

Below. Primaries and secondaries light chestnut-brown, slightly dusted with gray granules. Basal spaces of whitish tinge. The outer transverse line of primaries indicated in dark brown. Legs and abdomen yellowish-gray, dusted with black.

Types, ♂ ♂ and ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 24-25. mm.; ♀ 36-37. mm.

Length of body: ♂ 8. mm.; ♀ 10. mm.

Habitat: Southwest Utah (about 30 specimens) and Arizona, (Prescott, one specimen.) Easily recognizable by its gray primaries with dark band, traversed by white veins.

C. Mus. var. *discolorata.*

♂. Antennae, head and collar dark brown. Thorax and abdomen brownish-gray. Wings light brown. The two transverse lines of primaries dark brown, with an outer tinge of yellowish.

Below. Primaries light brown. The outer transverse line well marked

Digitized by Google

in darker brown. Secondaries of a somewhat lighter tinge, with yellowish dust. Brown mesian line. Legs and abdomen dark brown.

Type, 1 ♂ from S. W. Utah. Coll. B. Neumoegen.

Raised out of a lot of about 50 typical *C. Mus* by Mr. Chr. I. Weidt. It seems to be rare.

♀. Antennae dark brown. Thorax and abdomen brownish-gray. Wings chestnut, with somewhat lighter dusting along anterior margin, and in basal space. Well marked dark brown lines encircling transverse band of primaries. Secondaries with lighter basal shades.

Below. Wings light chestnut, with grayish granules along anterior margins and basal spaces. Outer transverse line of primaries, and mesian line of secondaries slightly indicated.

Types coll. B. Neumoegen.

Several specimens raised by Mr. Weidt in S. W. Utah, and one specimen from Prescott, Arizona, tallying with the foregoing, but being of somewhat lighter colour in its wings.

C. Azteca, nov. sp.

♂. Antennae brown. Head and thorax grayish-brown. Wings and body of a peculiar blackish-brown tint. Primaries: apex sharply pointed. A transverse band of still darker shade, the two border lines of the same especially dark, the outer line relieved by a yellow streak. Running parallel with the latter, from costa to inner margin, a subterminal undulating irregularly shaped band, giving the wing the appearance of having three transverse lines. The inner line, encircling basal space, well curved towards base; the anterior line somewhat outwardly curved in its course through median space. Secondaries uniform in colour. Fringes of both wings alternating with yellow.

Below. Legs and body grayish-brown. Wings of a lighter brown shade, powdered with yellowish grains along anterior margin of primaries and over the entire surface of secondaries. Primaries show the outer transverse line, and secondaries a well curved mesian line. Basal spaces the darkest in both wings.

♀. Blackish-brown, lighter in shade than ♂. Body concolorous. Antennae, head and thorax grayish-brown. Primaries with broad transverse band, the inner line well curved towards base and of grayish colour. The outer line grayish, somewhat bulging at centre and slightly dentated at veins. Secondaries uniform in colour, showing a faint trace of a mesian line. Fringes in both wings alternating with faint yellow.

Below. Wings uniform in colour, but of lighter tint than primaries, which show faintly the outer line of transverse band. Secondaries with a somewhat darker undulating mesian line.

Types: 2 ♂ ♂ and 2 ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 31. mm.; ♀ 36. mm.

Length of body: ♂ 6. mm.; ♀ 10. mm.

Habitat: City of Mexico and vicinity. Caught by Mr. Moonz.

This is the darkest coloured American Clisiocampa and easily recognizable.

Digitized by Google

DESCRIPTION OF A NEW TOLYPE.

BY B. NEUMOEGEN, NEW YORK.

P. tolteca, nov. sp.

♂. Antennae light brown. Eyes black. Head, prothorax and thorax snowy white. Tegulae snowy white, with black hairy centre band, connecting it with the black haired abdomen, just like in *T. velleda*, Stoll. Abdomen metallic black, clothed with long hair and long drawn out anal tuft. The latter intermixed with white hair. Primaries dark slate, especially in the interspace formed by a marginal and a double central transverse line, as well as along costa and internal margin. Veins white. A lunulate white discal spot, and whitish tinges around it. Three transverse, undulating, white lines, two of which are double, the discal space being enclosed by these double lines, and the marginal transverse line being single. The latter crosses from apex the subcostal veins in a straight line, parallel with anterior margin, but becomes undulating in traversing the median veins. A thin, dark line indicates anterior margin. Fringes light brown. Wings show irridescence in a slanting position. Secondaries dark slate, with gray fringes; anterior margin indicated by a thin black line.

Below. Palpi black below. Abdomen and legs snowy white, the latter pilose, having the tibiae dotted with black. Wings blackish slate, especially dark along costal and in basal spaces, with veins and undulating marginal lines of grayish white.

♀. Much larger and of lighter shade than ♂. Antennae, head, thorax and central thoracical streak the same as in ♂, but the hairy body snowy white, with gray segmentary tuft. The same transverse lines on primaries, the one near base and the central line, which enclose disc, being double, and only the marginal line being single. Basal area tufted with snowy white. Costa whitish. Fringes light brown. Veins white. Secondaries dark slate, with basal white tuft, a white undulating marginal line and grayish-brown fringes.

Below. Black palpi. White abdomen and legs, the tibiae with black dots. Anal portion of body covered with light brown hair. Wings slate colour with white nerves. Primaries showing the white double central and marginal, the secondaries only the marginal line. Basal areas and sections along marginal lines the darkest.

Types, 2 ♂ ♂, 2 ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 30. mm.; ♀ 45. mm.

Length of body: ♂ 10. mm.; ♀ 21. mm.

Habitat: City of Mexico and vicinity. Collected by Mr. Moonz.

This insect greatly resembles *T. velleda*, Stoll., but its transverse lines on primaries differ and it is easily distinguished by its smaller size and darker colour, especially on the secondaries.

Digitized by Google

CAN THE DIPTERA BE CONSIDERED THE HIGHEST INSECTS?

BY C. H. TYLER TOWNSEND.

In the Nov., 1892, number of the CANADIAN ENTOMOLOGIST, pp. 269-70, there is printed a paper which was read by Professor H. Osborn before the Entomological Club of the A. A. A. S. at its Rochester meeting in August, 1892. It is entitled: "Honey-bee or House-fly." In this article Professor Osborn questions the view, first advanced by Hyatt and Arms, that the Diptera are to be considered the highest insects. At the end of the paper appear the following remarks, which were made at the time the paper was read before the meeting:—

"Mr. Smith thought that the line of argument adopted by Messrs. Aldrich and Townsend was inconclusive, and that the article referred to carried with it its own refutation. He thought Mr. Osborn was correct in that the orders should be placed parallel, but that groups or families were more highly developed in some orders than in others. Mere specialization is never a test of rank in itself, and any line of argument that places the Hippoboscidæ at the head of the insects as the highest in rank is simply unworthy of attention, since it omits the intellectual or nervous development as a factor."

The over-confident and assuring manner in which the above paragraph disposes of the subject is rather ludicrous. One might fancy the question finally answered, and consigned to oblivion. I feel safe in saying that such a hasty and incompetent dismissal of the subject will command little attention from anyone who is well informed in insect embryology.

Professor Osborn's paper simply makes the point that there are objections to attempting an expression of lineal rank or descent in groups of animals, but that the orders of insects are divergent, or more or less parallel developments from a common form.

The writer, in his note on the subject in *Science* (June, 1892), did not attempt to express the idea that the orders of insects led up in a natural or any other series to the Diptera; nor is any such view held by Hyatt and Arms, or Professor Aldrich, in what they have written on the subject. I desire to say also that I have not in any way upheld the view that the Hippoboscidæ should be considered the culminating point, but have rather pointed to the cyclorrhaphous families as occupying that position.

It is very conclusively shown by Hyatt and Arms, Insecta, pp. 273-4,

Digitized by Google

287-8, that the Diptera are by far the most specialized insects, and that they should therefore be considered the highest in rank. If any one still doubts that they are the most specialized, he may be referred to the late edition of Lowne's Anatomy etc., of the Blow Fly, part I., Oct., 1890. The wonderful development of the muscid pupa from the imaginal discs, all the larval organs undergoing disintegration, is not paralleled in any other order of insects. I contend that specialization, as deduced from the ontogeny of the insect, is the best and only reliable criterion of rank. Let those who believe otherwise point out a better one. To talk of an intellectual development in insects is absurd. I do not admit that the actions of the social hymenoptera are in any way actuated by reason or intellect. It is, rather, inherited habit.

As to the ubiquitousness of the House-fly, this is rather a point in its favour. It has, entirely on its own resources, become emphatically cosmopolitan, and even man "in all his glory" is unable to reduce its numbers, or in any way to cope with it. On the other hand, the Honey-bee has for ages been cultivated, cared for and protected by mankind. Yet I would not by any means suggest the House-fly as the climax of insect development.

Man is the highest animal, because of his immense cerebral specialization. There is no such contrast in cerebral development between the lowest and highest insects as there is even between the anthropoid apes and man. Consequently I believe that the same factor should not be used as a criterion of rank in insects. At the same time, man is farthest removed from the ancestral mammalian form in his general structural development, as deduced from his ontogeny, and this can and should be used as the basis of argument, not only in insects, but in all other groups of animals.

This line of reasoning puts the Diptera at the head of the insect body, inasmuch as their larval stages show greater specialization or development than the larvæ of any other order of insects, while their perfect form points them out still more emphatically as the farthest removed from the ancestral thysanuriform type.

If there is an objection on the part of some to the term "highest", let the expression "most specialized" be substituted therefor. I cannot help believing that the use of the latter would be preferable.

Digitized by Google

A NEW ARRANGEMENT OF THE COLEOPTERA.

BY WM. HAMPTON PATTON, HARTFORD, CONN.

Coleoptera may be described as Mandibulate Insects, with the fore-wings horny and the two basal abdominal joints invisible on the venter.

A reduction in the number of abdominal joints at the tip and in the number of joints in the tarsi indicates advancement in rank among Coleoptera. Likewise, a specialization of the antennae to clavicorn or lamellicorn indicates advancement, as well as does the degradation of the larva. The Lampyridæ are the lowest in rank, shown by their lax structure. The Heteromera and Phytophaga show high development in the specialization of their tarsi. The Rhynchophora are especially aberrant, and there is evidence of advanced type shown in the low development of the apodous larvae, greatly specialized prosterna and concealed ventral segments. A few Heteromera, the Buprestinae and the Lamiinae resemble them in their larvae. The larvae of Bruchidae are similar to those of *Brenthus* and *Anthribus* in their minute legs. The Weevils may be placed ahead of the other Coleoptera, although the Chafers are nearly as high.

The Cicindelidae present a character not elsewhere found in the Dolichogastres, *i. e.*, a dilation of the metapleura. A similar, but more extended, dilation is characteristic of the Rhynchophora and Phytophaga.

The arrangement below is verified in the preceding paragraphs.

SYNOPSIS OF COLEOPTERA, TWO SERIES.

DOLICHOGASTRES.—Six or more ventrals visible (exc. Elateridae and Buprestidae).

= Metapleura not widened (exc. Cicindelidae). Pentamerous (Normopleura).

First visible ventral entire. Series *Serricornia* (Malacodermes, Sternoxi). Series *Monilicornia* (Brachyelytra).

First visible ventral divided by the coxæ. Series *Filicornia* (Adephaga).

BRACHYGASTRES.—Only five ventrals usually visible.

= Metapleura not widened. Six ventrals in many families (Normopleura).

Heteromerous. Series *Heteromera*. First visible ventral not divided by coxae. Antennae various.

Pentamerous.

Series *Clavicornia* (Philhydrida, Necrophaga).

Series *Pectinicornia*. Series *Lamellicornia*.

Digitized by Google

= Metapleura widened (Tetramera). Never more than five ventrals. (Platypleura).

Series *Phytophaga.*

Series *Rhynchophora.*

The conclusion which may be drawn from this synopsis is that the Tetramera are the equivalent of all other beetles taken together. Those who follow LeConte's views would place the Rhynchophora apart from all others; then the division would be into Tetramera and Pentamera, the last including the Heteromera and Trimera.

A GENERAL SUMMARY OF THE KNOWN LARVAL FOOD-HABITS OF THE ACALYPTRATE MUSCIDÆ.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In a short paper published in the Trans. Kans. Acad. Sci., Vol. XIII., on the occurrence, in a single restricted locality in Arizona, of a species of *Micropeza*, I gave a very brief resumé of the food-habits of some of the better known families of Acalyptrate Muscidæ, with the view of suggesting the possible habit of the species there considered. This prompted me later to bring together all available notes on the subject. As these small flies are of much economic importance, both as being injurious and beneficial, I have felt that a quite complete summary of their larval food-habits would be of much use to the working entomologist, besides being of no little importance to those who may be making a special study of the diptera. I should acknowledge drawing a considerable number of the notes from Schiner, Westwood and other European authors. All such refer to European species, but often apply equally as well to American species, when such exist in the genera named. All are of importance as indicating the great range and variety of the food-habits in this section of the Muscidæ The only families of whose larval habits nothing seems to be known are the *Micropezidæ*, *Phycodromidæ*, *Opomyzidæ*, *Leiopsidæ*, *Asteidæ* and *Geomyzidæ.*

According to their habits, the larvæ of the Acalyptratæ may be grouped in three categories: Scavengers, phytophagic species, and entomophagic or parasitic species. These groups may be separated into sub-groups, as will be seen from the accompanying synoptic view:

Digitized by Google

Synopsis of larval habits of the Acalyptrate Muscidæ.

- **Scavengers.**
  - Coprophagous species or dung-feeders.
  - Feeders on decaying vegetable matter.
    - In decaying fruits.
    - In decaying wood and under bark of trees
    - In decaying plants and leaves.
    - In decaying roots and tubers.
    - In fungi.
  - Feeding in fluids.
    - Salt or alkaline water and mud.
    - Urine.
    - Vinegar.
    - Sap from wounds of trees.
  - Feeders on animal matter.
    - Cheese.
    - Animal fats.
- **Phytophagic species.**
  - Gall makers.
  - Fruitfeeders
    - Infesting soft fruits.
    - Living in pods, seeds and berries.
    - Living in flower heads.
  - Leaf miners.
    - In water plants.
    - In foliage of trees and land plants.
  - Feeders in stems of plants and holms of grasses.
  - Root feeders.
  - Feeding in seaweed.
- **Entomophagic species, or group with a parasitic tendency.**
  - Parasites?
    - In scales.
    - In plant lice.
  - Pseudo parasites?
    - On scale insects.
    - On plant lice.
    - On larvæ.
  - Inquilines in bees' nests.

Summary of larval habits.

Fam. CORDYLURIDÆ:

Norellia spinimana; larva found on an anthomyiid larva (Bremi).

Cleigastra apicalis; larva in noctuid caterpillar (Boié). *Cl. suisterci;* bred from larvæ in swine dung (Townsend, CAN. ENT.)

Scatophaga; larvæ in dung and human excrement, also in water (Sch.).

Fam. THYREOPHORIDÆ:

Thyreophora; larvæ found in anatomical preparations (Rob. Desv.)

Fam. HELOMYZIDÆ:

Helomyza; larvæ in fungi and truffles (Westw.)

Leria serrata; larvæ in dung (Bremi), in fungi (L. Dufour).

Thelida; a species on bat dung (Rob. Desv.)

Digitized by Google

Fam. HETERONEURIDÆ:

Clusia; pupæ in mouldered tree trunks (Staeger).

Heteroneura; larvæ and pupæ under bark of trees and in decaying tree trunks. *H. albimana;* bred by Schiner from pupæ found in trunk of a weather-beaten willow.

Fam. SCIOMYZIDÆ:

Dryomyza; larvæ in fungi (Meq.)

Actora; breeds in seaweed (Boh.)

Tetanocera ferruginea; larvæ live between the leaves of Lemna and Callitriche in water (L. Dufour).

Fam. DORYCERIDÆ:

Dorycera; larvæ live amongst leaves of water plants, several species being subcutaneous (Westw.) *D. graminum;* larvæ in water (Geoffr.)

Fam. PLATYSTOMIDÆ:

Platystoma umbrarum; larvæ live in decayed wood underground (Perris).

Fam. ORTALIDÆ:

Herina (Ortalis) frondescentiæ; larvæ feed on pulp of cherry (Réaumur).

Tritoxa (Ortalis) flexa; larvæ live in onions.

Psairoptera; larvæ of a species found under bark of Pinus, and Populus tremula (Sch.)

Chloria (Ulidia) demandata; larvæ in old horse dung, where they passed the fall and winter (Bouché).

Chaetopsis aenea; bred from larvæ found July 5 burrowing in the centre of a stalk of corn (Gillette).

Fam. LONCHÆIDÆ:

Lonchæa nigra; larvæ in the stems of Verbascum, Angelica and Carduus. *L. parvicornis;* larvæ in suckers of Triticum repens, on which they cause galls with a scale-like covering, the dead leaf-sheath (Perris). *L. lasiophthalma;* larvæ under similar circumstances on suckers of Cynodon sp. Larvæ of other species under bark of trees (Giraud).

Digitized by Google

Fam. SAPROMYZIDÆ:

Sapromyza; larvæ under decayed leaves (Bouché), in rotten straw (Perris), and in fungi (L. Dufour).

Fam. TRYPETIDÆ:

Platyparea; larvæ of a species in asparagus (Sch.)

Euphranta; larvæ of a species in pods of Vincetoxicum officinale, pupating in the earth (Giraud).

Aciura femoralis; bred from larvæ found in Phlomis fruticosa (v. Frauenfeld).

Acidia; larvæ of a species in leaves, which they mine (Sch.) Larvæ of another species in fruit of Lonicera xylosteum (Lev.) *A. artemisiæ;* larvæ mine leaves of Chrysanthemum (Westw.)

Spilographa; larvæ in fruits or berries, while some mine leaves (Sch.) *S. alternata;* larvæ in berry of Rosa villosa (Bouché, quot. by Westw.)

Orellia wiedemanni; larvæ live in leaves of Bryonia (Sch.)

Trypeta; larvæ of many species live in flower heads of various compositæ.

Rhagoletis (Trypeta) pomonella; larvæ in apples (Wlsh.)

Acrotoxa (Trypeta) ludens; larvæ in oranges (Riley).

Eurosta (Trypeta) solidaginis; larvæ in galls on stems of solidago (Fitch).

Urophora; larvæ of many species live in various parts of composite plants (Sch.) *U. cardui;* larvæ in large galls on thistle (Westw.)

Myopites; larvæ in flower-heads of Mula sp. (v. Frauenf., v. Roser).

Ensina sonchi; larvæ live in flower-heads of Sonchus, Apargia, Senecis, Tragopogon, Podospemum (Sch.), Carduus (v. Frauenf.)

Carphotricha; larvæ live in Compositæ, preferably Ligulifloræ (Sch.)

Euleia onopordinis; larvæ mine in leaves of celery (Westw.)

Oxyphora; larvæ in flower-heads of various Compositæ (Sch.)

Tephritis; larvæ in flower-heads of Compositæ (Sch.)

Anomoia; larvæ of a species in berries of Crataegus oxyacantha (Sch.)

Ceratitis capitata; larvæ in peaches, oranges and other citrus fruits (Westw.)

Dacus oleæ; larvæ in olives, two or three larvæ in a fruit, pupating in the earth.

Digitized by Google

Eutreta diana ; larvæ in gall on wild sage, Artemisia tridentata, in Mo. (Riley, Osten Sacken).

Straussia (Trypeta) longipennis ; the fly oviposits in stalk of Helianthus (sunflower) near tip, in June and July (Lintner, 3d. Rep.)

Fam. SEPSIDÆ :

Nemopoda cylindrica ; larvæ in human excrement (Bouché, West., Sch.)

Themira putris ; larvæ in slimy water and mud (Sch.)

Fam. PIOPHILIDÆ :

Piophila ; larvæ in cheese, ham-fat and fatty animal matter in general (Swamm.). In salt (Germer).

Fam. PSILIDÆ :

Chyliza leptogaster ; bred from irregular galls the size of a walnut on the stems of Spiræa opulifolia—not known that the galls were caused by these flies (Scholtz).

Psila rosæ ; larvæ in roots of Daucus (carrot) and Brassica (Sch.)

Fam. OSCINIDÆ ;

Platycephala ; pupæ of one species in reed stems (Boié)

Meromyza americana ; larvæ in stems of wheat, rye and probably in grasses (Riley, Webster and others).

Chlorops ; larvæ of several species live in holms of grasses and cereals. *Chl. pumilionis*, *Chl. glabra ;* larvæ injuring wheat (Bjerkander, Westw.)

Chloropisca prolifica ; supposed by Dr. Lintner to breed in grass of lawns (7th Rep. N. Y. Ent., p. 239).

Lipara ; larvæ in reed stems, causing large galls near the tops, in which they pupate (Sch.)

Oscinis ; larvæ live in holms of grasses and cereals. *O. frit ;* larvæ in husks of barley in Sweden (Linn.) Species in wheat in U. S. (Garman, Webster).

Siphonella ; larvæ in grasses, also in other plants (Sch.) Two species in flower-heads of various Cynerocephalæ (Egger, v. Frauenf. Larvæ of one species in worm-eaten nuts, in company with curculionid larvæ (Perris, v. Frauenf)

Elachiptera ; pupæ on a species in large quantities under the bark of old poplars (Sch.)

Digitized by Google

Gampsocera; larvæ in decayed stems of Althea (H. Heeger).

? Novum genus; bred in California from a spider's egg-mass.

Fam. EPHYDRIDÆ:

Halmopota; larvæ in salt-pits (Bouché).

Ephydra; larvæ in salt-pits (v. Heyden), in salt-pits of Kissingen (Diruf). *E. californica;* larvæ live in great numbers in water of alkaline lakes in the south-western U. S. (Packard, Williston). *E. hians;* larvæ in immense numbers in water of Lake Tezcuco, in Mexico, and are used by the Mexican Indians as food. It may also be mentioned that the larvæ of E. californica are used by the Pah-Utes as food (Williston).

Teichomyza fusca; larvæ live in urine (Rob. Desv.)

Fam. DROSOPHILIDÆ:

Aulacigaster; larvæ of only species found in wounds on elm trees (L. Dufour).

Gitona; larvæ of only species live in flower-heads of Sonchus arvensis (Loew), probably also in flower-heads of Onopordon (Sch.)

Drosophila; larvæ usually in sour-fermented matter, fermented liquids, vinegar, decayed fungi, ulcerated wounds of trees, decayed fruits (Sch.) *D. ampelophila;* larvae in pomace of cider mills, in pickled and preserved fruits (Lintner), bred from maggots found hollowing out grapes (Forbes). *D. quinaria;* bred from a mass of cochineal insects (Riley & Howard). Some species (Scaptomyza Hardy) are leaf-miners (Sch.) One or more species mine turnip leaves in Europe and U. S. (Curtis, Garman).

? Stegana; breeding in hen dung (Riley & Howard, Ins. Life, II., 254). It is perhaps doubtful whether this fly belonged to the Drosophilidae.

Fam. OCHTHIPHILIDÆ:

Leucopis; larvae parasitic (?) on plant lice and scale insects, (?) in spiders' nests (Sch.) *L. bellula;* reared from cochineal insect (Riley & Howard). *Leucopis* sp.; parasitic (?) on Rhizococcus sp. on grasses in Nova Scotia (Fletcher).

Lestophonus iceryae; parasitic (?) on Icerya (Riley).

Digitized by Google

Fam. MILICHIDÆ :

Cacoxenus indagator ; larvæ live in nests of Osmia emarginata, consuming the food prepared for the Osmia larvae and causing them to die (Giraud). Probably found in other bees' nests (Sch.)

Fam. AGROMYZIDÆ :

Agromyza ; larvae are leaf-miners or live in pith of plants (Sch.) *A. tritici ;* bred from larvae crawling in large numbers from unthreshed wheat in a barn (Fitch).

Ceratomyza ; larvae of one species mine leaves of Sonchus oleraceus (Sch.)

Fam. PHYTOMYZIDÆ :

Phytomyza ; larvae are leaf-miners (Sch.), some species pupating in the parenchyma of the leaf (Chromatomyia Hardy). *P. chrysanthemi ;* larvæ mine leaves of Chrysanthemum, Tanacetum, Eupatorium, Gazania, Helianthus, Cineraria (Lintner). *P. lateralis ;* larvae live in heads of Anthemis, Pyrethrum, and in stems of Centaurea, Verbena and Urtica (Kaltenbach), mining in Sonchus (Gourean). *P. flava ;* larvae in subcutaneous mines in leaves of Scolopendrium vulgare, a fern (Doubleday). *P. flaviceps ;* larvae mine leaves of woodbine (Hal.) *P. obscurella ;* larvae mine leaves of holly (Hal.), in honey suckle (Glover). *P. nigricornis ;* larvae mine in underside of leaves of turnip, peas, forming long galleries in parenchyma beneath lower cuticle, pupating at end of gallery (Curtis), also mine leaves of monkshood, Aconitum (Kaltenbach).

Fam. BORBORIDÆ :

Borborus ; larvae in dung and decayed fungi (Haliday).

Sphaerocera ; larvae live in horse dung (Sch.)

Limosina ; larvae of a species in Confervae, in diseased potatoes, and in fungi (Sch.)

NOTE.—If any genera whose larval habits are known have been omitted, or if any peculiarity in habit of a genus here mentioned is not included, the author will be glad to know of the references or observations. The list is not supposed to be complete.

Digitized by Google

LARVÆ OF PAPILIO PHILENOR BECOMING LARVOPHAGOUS.

BY RICHARD E. KUNZE, M. D., NEW YORK.

"I perish by my art; dig mine own grave;
I spin the thread of life; my death I weave."

Truly wonderful is the adaptability of some individuals when placed under circumstances tending to diminish the reproduction of their race. Desirous of raising larvæ of *Papilio philenor*, I planted two years ago five vines of Dutchman's Pipe (*Aristolochia sipho*) in my back yard, which in the summer of the present year (1892) covered a wall and fence 16x7 feet with luxuriant foliage.

July 2nd a friend brought me, from Staten Island, N. Y., from 125 to 150 larvæ of *Philenor*. The majority had passed their first, and a few their second moult. All were transferred to the leaves of the Dutchman's Pipe vine in my garden plot. By the ninth of July nearly all the leaves of my Pipe vines were devoured, before less than half of the leaves were full grown. I then removed fifty of the largest to a five-gallon flower pot, covering the bottom with a layer of loam, and filling up this breeding cage with as many leaves of *Aristolochia sipho* as it would hold. The pot and loam were first well sprinkled with water to furnish moisture for stems of *Aristolochia* vines, and the top covered with thick manilla paper to prevent evaporation, inasmuch as the porosity of the cage answered every such purpose. Two days later the leaves of breeding cage were all devoured, and those on my vines in the garden nearly so. I divided what remained of the latter, and gave an equal share to larvæ in the cage. Exactly forty-eight hours afterward the Pipe vines of the garden were entirely defoliated, and the larvæ contained in the flower pot nearly all transforming into chrysalids.

Two days previously I requested my friend, Mr. Ehrenberg, who furnished the larvæ, to procure me a supply of *Aristolochia* leaves from Staten Island, where he officiated as landscape architect at a well-known villa, else most of our larvæ would perish. In the meantime the owner of the villa noticed the foliage of his *Aristolochia* trellis disappearing rapidly, caused by the remaining larvæ which my friend had failed to take off for me. His,(the owner's) instructions to the resident gardener to keep these larvæ well picked off had not been observed, he thought, while the landscape architect tried to raise a few more chrysalids on the trellis facing the

Digitized by Google

villa, and suggested to the gardener to defer operations a few days longer. The owner, not knowing of our intentions, became vexed and gave an Italian labourer a bagfull of sulphur, with orders to dust the *Aristolochia* with it effectually. How well the instruction was carried out may be inferred when it is known that those plagued worms, all the remaining foliage and much of the grass beneath the vines, were totally destroyed!

At the same time, while in expectation of an abundant supply of larval food, I had collected from the bare vines, wall and fences of the yard, from the passage ways of the house, and wherever they wandered in search of food, some sixty hungry larvæ. These were put into a lady's large bonnet box, and some fifteen different food plants which grew on the premises were placed therein to serve that wriggling mass of large black larvæ with long concolorous tubercles their immediate wants. But touch it they would not. On the evening of the ninth of July my friend returned from Staten Island without any food plant, and informed me of our misfortune. I knew of only two more private places in this city, and another in Astoria, Long Island, where *Aristolochia sipho* is cultivated. Not being acquainted with the owners, I could not obtain a supply.

The children of neighbours brought me numbers of my *Philenor* larvæ which had crawled into their yards and gardens. I decided to keep only the largest of these famishing larvæ, thinking to obtain a few more chrysalids while waiting for a possible supply of food plant, which, however, did not come. All others I gave liberty to go where they pleased. Many returned to the bare stem of my *Aristolochia*, where they nibbled at the epidermis of the vines until most had perished.

Necessity compelled the larvæ I had in that bonnet box to become *Entomophagous*, so to speak. Not a leaf of a plant, shrub or tree, wild or cultivated, would they eat. On the 11th of July I observed several of the caged larvæ had spun a thread of silk across their bodies and were suspended by their anal hooks from the sides of the cage. A number of other hungry larvæ were attacking and devouring their own kind which were helplessly "hung up" and could not escape from the onslaught of these carnivorous larvæ. On the next day I discovered a few chrysalids suspended from the box, which during transformation had escaped attack, while others were being devoured. But before they hardened sufficiently to permit of removal these chrysalids, too, were attacked and converted into food! It was a disgusting and repellant sight to witness. From day

Digitized by Google

to day this larval cannibalism continued to enable a number of individuals to transform into the second stage. When the chrysalis was not at once removed it would soon disappear, excepting only the outer case. Sometimes 3 or 4 larvæ would attack a suspended larva at the same time, and whenever a dismembered portion of the victim fell to the bottom of the cage other larvæ would seize and devour it. A dozen larvæ and as many chrysalids were eaten up in four days, and not even the skin of a larva would remain. Thermometer ranged from 80° to 92° in the shade, but no sign of decomposition was noticeable in cage. It was dog eat dog, and not even bones left to tell the tale!

July the 16th only nine larvæ were left, and two chrysalids transformed the previous day were in an unsightly condition—literally disemboweled. All of these larvæ were very lively, but whenever ready to transform would never be more than two-thirds the size of those naturally fed. One more unfortunate hung by its anal feet to become the next victim in order. July the 19th three larvæ were alive, of which one was "spinning the thread of life". I again placed 8 or 10 kinds of food plants in the cage, which in twenty-four hours were untouched. One chrysalid was left intact. I now placed the remaining two larvæ on my *Aristolochia* vines, inasmuch as a new growth of leaves was in sight. These immediately fed upon the tender food offered. A number of others, barely alive, were nibbling away at the bare vines lower down on the plants, and had not yet discovered the new foliage.

Altogether these were a most carnivorous lot of larvæ, from which I obtained only five chrysalids out of a possible twenty-five larvæ retained in that cage. From one of these emerged, in September, a ♂ imago of the normal colour, but smaller in size.

I am not aware that larvophagous caterpillars have been reported as occurring among Rhopalocera. In the *American Naturalist*, Vol. XX., page 556, it is stated that a Lycænid larva of *Feniseca tarquinius* feeds upon an Aphid which is found only on the branches of alder *(Alnus serrulata)* affecting swampy localities. One of my liberated *Philenor* larvæ fed upon a cultivated plant of *Azalea indica*, which was a potted plant fifteen inches in height. I discovered the chrysalid in September, and this was the only exception as far as I could discover where these had not fed either upon *Aristolochia sipho* or their own kind.

Digitized by Google

SYNOPSIS OF THE ASILID GENUS ANISOPOGON.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table includes those species of *Anisopogon* at present known to occur in this country north of Mexico :—

1.—Scutellum (except sometimes its extreme base) black.....2
Scutellum and face yellow, abdomen yellow, marked with five black fasciæ, wings pale yellow..... .....*vespoides*, Bigot

2.—Abdominal segments one to four wholly black.....3
Abdominal segments three to six (except sometimes their lateral margins) reddish..... 5

3.—Wings pure hyaline, the cross veins and furcations alone sometimes clouded with brown ; tibiæ reddish..... 4
Wings more or less brown, the apex never blackish....*ludius*, n. sp.
Wings having the apical half blackish..... { *phœnicurus*, Loew. / *gibbus*, Loew.

4.—Pollen of abdomen extending on the bases of the segments .....
.....*senilis*, Bigot.
Pollen confined to the apices of the segments.....*lautus*, Loew.

5.—Wings nearly uniform, smoky-gray; head, first two joints of antennæ, thorax and legs obscure brown.....*rubidus*, n. sp.
Wings smoky-brown, darkest on apical half; head, antennæ and thorax black.....*patruelis*, n. sp.

Anisopogon ludius, n. sp. ♂.—Black, the tibiæ and tarsi dark reddish-brown. Face gently convex, white pilose, bristles of lower part black ; first joint of antennæ slightly longer than the second, the third joint tapering to the tip, three times as long as the second, the style slender, seven-eighths as long as the third antennal joint ; pile of occiput, thorax, pleura, coxæ and venter white ; upper side of each front tarsal joint with a dense covering of appressed white hairs ; upper side of middle femora toward its apex with a dense covering of short appressed black hairs, which, however, leave a large elliptical naked space between the apex and the middle ; middle tibiae white pilose in front, and above the middle ornamented with a large patch of appressed black hairs and bristles, which form an inner and an outer fringe; inner side of hind tibiae near the tip, and also of the hind metatarsi, densely bright yellow pubescent ; wings smoky brown, lightest at the apex and along the hind margin ; all posterior and the anal cell open.

♀ as in the male, except that the front tarsi, middle femora and

Digitized by Google

tibiae are not ornamented as in the male, and the wings are much lighter, the brown forming a border to some of the veins. Length, 12-16 mm. Los Angeles and San Bernardino Counties, California, and British Columbia. Two males and three females, in May. The British Columbia specimen was received from Mr. W. A. Danby.

This species is closely related to *A. senilis* Bigot, but in the latter species the wings are wholly hyaline, and the appressed white hairs on the front tarsi of the male are confined to the first joint. I have specimens of the latter species from Colorado and Florida (Morrison). In both species, the colour of the bristles on the head, body and legs is too variable to be of any value in separating the species.

Anisopogon rubidus, n. sp. ♀.—Obscure brown, the following parts black :—The third antennal joint, basal half of style, proboscis, palpi, scutellum except its base, first segment of abdomen, basal half of second, lateral margins of the others, seventh segment and genitalia largely, apex of venter and upper side of each femur, that on the first and second segments of abdomen with a strong bluish tinge, brown of abdomen more reddish than on the other parts ; thorax irregularly marked with grayish black. Head gray pollinose, the pile yellowish-white ; face evenly convex, the pile extending nearly to base of antennae ; first joint of antennae slightly longer than the second ; third joint slightly longer than the first two taken together, tapering gradually to the apex, the style two-thirds as long as the third joint. Thorax gray and golden pollinose, the pile short, sparse, mixed black and white ; pleura gray pollinose, its pile and that of the coxae white, the fan-like pile in front of halteres also white. Pile of abdomen sparse, microscopic, light-coloured, that on lateral margins and on venter longer, whitish. Pile of legs sparse, whitish, that on tarsi and tips of tibiae largely black. Wings smoky gray, all posterior cells and the anal cell open.

♂ same as the ♀, except that the middle femora have each a cluster of black pile at its apex in front and two similar fringe-like clusters, one on the upper, the other on the lower surface at its last third, and above the middle of each middle tibia are two long dense fringes of black pile on its inner and outer sides, connected with each other in front ; front metatarsi destitute of appressed white pile. Length, 14 to 17 mm. Los Angeles County, Cal. Four females and one male.

Anisopogon patruelis, n. sp. ♂ ♀.—Same as the above description of *rubidus*, with these exceptions :---Head, antennae, thorax, scutellum and

Digitized by Google

femora, except the apex, black; apical third of the first abdominal segment and the apical three-fourths of the second segment reddish in the female, but black in the male. Style one and a-fourth times as long as the third antennal joint. Wings smoky brown, lighter on the base as far as the furcation of the second and third veins; a lighter transverse shade passes through the middle of the discal cell. Front metatarsi of the male densely covered with appressed white hairs above. Length, 13 to 16 mm. Texas. A single male and female received from the late H. K. Morrison.

THE LARVA AND CHRYSALIS OF CHRYSOPHANUS DIONE.

Some time ago Mr. Henry G. Willard, of Grinnell, Iowa, very kindly sent me some of the full grown larvæ of this species. I made a few notes at the time which may be of use, owing to the fact that nothing has been published in regard to the early stages of this butterfly. The food plant at the home of the insect is *Rumex longifolius*, but they readily ate our common species of dock found here. The full grown larva were onisciform in shape, grass green in colour, and 20 mm. in length. Most of them had a narrow, claret-coloured dorsal stripe, and the entire body, under a glass, was seen to be clothed with minute black hairs. The larva is of the same general appearance as that of *Chrysophanus hypophleas*, but larger. The chrysalis is the same shape as most others in the Lycænidæ, and looks very much like Scudder's figure of the chrysalis of *E. thoe*. In colour the chrysalis is a light hay colour, and the dorsal abdominal segments are heavily marked with blackish blotches. The dorsal thoracic segments are peppered with black spots. The wing covers are lightest in colour of any part, but are also peppered with the fine black points. The head, eyes and shoulder-joints are covered with black blotches. One chrysalis, which I think was entirely green and without the black markings, disclosed a *C. thoe*, but I did not notice any difference in the larva I had, so I conclude the larvæ of the two species look very much alike. Mr. Willard could perhaps give us something interesting about the times of appearance and habits of this butterfly, as it is common in his locality.

HENRY SKINNER, M.D., Philadelphia.

Digitized by Google

NOTES ON ZARÆA AMERICANA.—CRESS.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

The young larva of *Zaræa Americana* appears in the beginning of July on *Menyanthes trifoliata*. It lies curled on the underside of the leaf. Its head is black, and its body lead-colour above and greenish-white beneath. It develops into the most beautiful larva of any of the Tenthredinidae that I am acquainted with.

Description of the full-grown larva.—Length one and a-quarter inches. Head black. Body above lead colour—excepting the anal segment, which is greenish white. The underside and the legs are greenish-white. The forelegs are tipped with black. Along the back are eleven pairs of raised and conspicuous bright yellow spots. Between the pairs, and on either side of them, are conspicuous jet-black spots, which, taken with the yellow ones, form rows across the back. There are other rows of *smaller* black and *pale-yellow* spots—two after each row of the larger ones. The side lines are white. Above these lines, on the margin of the lead-colour, is a row of black dots. Beneath them, just above the legs, is a series of raised yellow spots—each spot being surmounted by one or two black dots.

The larvae were plentiful in one spot, but could hardly be said to be *gregarious*, as only one or two were to be found on a plant. Towards the end of July the larva spins around itself a closely woven, dark-brown cocoon. In the spinning it usually gathers several leaves of the plant about it. The larva remains unchanged in the cocoon till spring, when it assumes the pupal state. The fly makes its appearance in the middle of May.

Description of the perfect insect.—In length the fly measures about nine-twentieths of an inch; and in expanse of wings about eighteen-twentieths. The antennae are dark brown, six-jointed and clavated. The wings are faintly clouded with brown. The head and thorax are dark brown and hairy. The abdomen, which is oval in outline, is of a rich velvety-brown above, with a slightly bronzy-green lustre. The colour fades into light reddish-brown on the sides and on the two last segments. The underside of the abdomen is pale brown. The tibiae and tarsi are white, and have a waxen appearance. The fly seems to be somewhat sluggish in its habits.

I am indebted to Mr. E. T. Cresson for the identification of the insect.

Digitized by Google

A NEW FORM OF PRIONIA, AND NOTES ON PLATYPTERYX ARCUATA AND P. GENICULA.

BY GEORGE H. HUDSON, STATE NORMAL SCHOOL, PLATTSBURGH, N. Y.

Prionia levis, n. var. or sp.

Primaries without the delicate frosted or silvery appearance, and without the numerous short, fine, strigate, brown lines of *bilineata*. The brown scales are present, but are uniformly and evenly distributed, save where they form the two brown lines which cross the wing, and a little darker shading near the outer edge and apex. These two transverse lines are about a third wider apart than in *bilineata*, the second narrowly edged externally with the clear, pale yellow ground-colour of the wing. There is no brown submarginal line, but a wavy, pale yellow line runs from inner margin to costa, midway between the second line and the outer margin. The vestiture appears to be more dense and smooth than in the allied form. Both primaries and secondaries seem to have a more decided ochreous tint.

Underside with markings more obscured.

Described from one male taken Aug. 13, 1887, and one female taken Aug. 3, 1890; both from the electric lights.

This may prove to be a seasonal form of *bilineata*. My dates of capture for the latter, since 1886, are as follows (the figure after the hyphen giving the number of specimens). May 8, 10-2, 15-3, 19; June 16, 22-2, 30.

Mr. H. G. Dyar, while here last summer, suggested that this new form might be the one which the late Mr. Hy. Edwards (CAN. ENT., XIX, 146) referred to *P. lacertinaria*, Linn. (=*lacertula*, Den. and Scheiff.). Both *P. bilineata* and *P. levis* are distinct from the European form, although very closely allied to it. Mr. Dyar also called my attention to the fact that this form seems to vary somewhat after the manner of *Platypteryx genicula* from *P. arcuata*, as pointed out by Dr. Packard in "Proceedings of the Boston Soc. Nat. Hist.", Vol. XXIV., page 491, 1890. We separated the two forms and then looked up the dates of capture, with results as follows:—

Platypteryx arcuata.—May 10-2, 11, 16-2, 19, 21-2, 24; June 1-2, 3, 9; July 27.

P. genicula.—July 7, 13, 27-3, 28-2, 31-2; Aug. 2-4, 3-2, 14.

Digitized by Google

FEMALE OF CROCOTA ROSA, FRENCH.

BY G. H. FRENCH, CARBONDALE, ILL.

In describing this species in Vol. XXII., page 133, of the CANADIAN ENTOMOLOGIST, I had before me two males, one from Texas and one from Ohio. I have now before me a fine fresh female from Champaign, Ill., the first of this sex I have seen, and I will give here some additional characters of the species. The forewings are fawn, a little darker than in the type, but the latter was evidently a little faded. The hindwings have a few dusky scales in the outer border near the anal angle. On the forewings the veins are a trifle darker than the spaces between the veins, but only from the wing being thicker here. Antennae a shade darker than the forewings; a semi-ring back of the eyes that is red tinted, as also the underside of the palpi; upper side of tibiae a little more red tinted. Abdomen above concolorous with the hindwings, an obscure row of dorsal dusky spots; whole of underside of body concolorous with upper side of forewings.

CORRESPONDENCE.

A CORRECTION.

Sir,—On page 225, CAN. ENT., 1892, I described a new Bombycid genus, *Melia*. Finding that this name is preoccupied, I have changed it to *Eumelia*, calling the insect proper *Eumelia Danbyi*, Neum.

B. NEUMOEGEN.

HONEY-BEE OR HOUSE-FLY.

Sir,—The November number of your journal contains upon its first and second pages some rather misleading comments on an article of mine in *Scienee*, of April 29. There was nothing in the article to justify the intimation that I had arranged any insects in a "linear series." The article was in the main a re-statement of Hyatt and Arms's view of the systematic position of the Diptera. To this I added several considerations tending to reinforce their conclusions. I referred to their placing "the Hymenoptera second and the Lepidoptera third," but this does not necessarily imply anything "linear." See their book "Insecta."

So far am I from holding the views imputed to me that I prefer not to regard any of the groups as representing "parallel branches," believing that "we should make an effort to avoid the expression of lineal rank in groups of animals."

Digitized by Google

I purposely based my conclusions upon anatomy alone, because, as I said, "to introduce the subject of instinct or of usefulness to man, is to confuse our ideas, for we cannot translate the data furnished by such a criterion into terms of the other standard." Judged from that position, it is very much out of the way to assert that "mere specialization is never a test of rank in itself." All that I tried to show was that, anatomically considered, the Diptera are the most highly specialized order.

I trust that it is not out of place to add that the author of one of our principal introductions to entomology, a man whose opinions have as great weight as anyone's in this country, informed his class in entomology last summer that he had come to the conclusion that the Diptera are the highest order. I was so informed by one of his students.

J. M. ALDRICH.

Brookings, South Dakota, Nov. 11, 1892.

NOTES.

MELANCHROIA CEPHISE, HÜBN

The genus *Melanchroia* has been associated in our lists with *Gnophaela* to form a family *Pericopidæ*. As a matter of fact it is a veritable geometer, with little more relation to *Gnophaela* than is expressed in the statement that both are Macro-Heterocera! This has, indeed, been recognized in Europe, and Mr. Butler, when identifying my specimens as *M. cephise*, added the remark "belongs to the geometrites".

M. cephise is very common in Kingston, Jamaica, and on Aug. 5, last year, Mr. Bowrey kindly gave me a number of the larvae. These were of the usual form of geometrid larvae, and from them I drew up the following description:—

M. cephise: Larva about 22 mill. long, body smooth, with a few short hairs, which are hardly visible without a glass. Head yellow-brown, the mouth parts dark. Thoracic legs yellow-brown. Abdominal legs tinged yellow-brown. Body pale yellow, with a black ring on each segment, which extends downwards only as far as the infraspiracular line (except that on the 4th body segment, which is continuous below). These rings are broad on the 4th to 8th body segments, but rather narrow on the others. There is a longitudinal, narrow black subdorsal line, and a black infraspiracular line, which broadens into triangles (which are spotted with white) at the junctions with the black rings. The edges of all these black bands are whitish.

The very young larvae are marked in similar way to those which are mature. The pupa is brown and rather shiny. The moths began to emerge on Aug. 15th.

T. D. A. COCKERELL,
Institute of Jamaica, Kingston, Jamaica.

Digitized by Google

HALISIDOTA MACULARIA, WALK.

I find on further search that *H. macularia*, Walk. (see CAN. ENT. Vol. XXIV., p. 306), is made a synonym of *Alpenus maculosus*, Stoll., whose habitat is given as West Africa. The citation of it from North America can only be the result of an error. The occurrence of *Halisidota megapyrrha*, Walk. (= *Ammalo helops*, Cram.), is also doubtful, though not so much so, as its home is in Surinam.

HARRISON G. DYAR, Roxbury, Mass.

ASTATUS BICOLOR, SAY.

In the excellent synopsis of the difficult genus Astatus, by Dr. William J. Fox, published in the September number of this journal, I believe that gentleman to be in error as to his identification of *A. bicolor*, Say. This is an undersized species, not uncommon in Illinois, having the stigma and the contiguous portion of the submarginal vein of a yellowish rufous colour—"pale rufous", Say writes—and not black, as Dr. Fox states; the legs black, as usual. The species described by Dr. Fox as new, under the name *pygidialis*, appears from the description to agree closely with *bicolor*, scarcely differing except in the rufo-testaceous colour of the legs and on the clypeus and antennal scape, which parts are black in *bicolor*. It is possibly an extreme variety of the latter species. I would arrange the synonymy of this group as follows:—

ASTATUS RUFIVENTRIS, Cress.
♀ *rufiventris*, Cress. Trans. Amer. Ent. Soc. IV., p. 218.
bicolor, Fox. CAN. ENT. XXIV., p. 232.

A. BICOLOR, Say.
♀ ♂ *bicolor*, Say. Lec. Ed., I., p. 166.
terminata, Cress. Trans. Amer. Ent. Soc. IV., p. 218.

A. PYGIDIALIS, Fox.
pygidialis, Fox. CAN. ENT. XXIV., p. 234. (? = var. of *bicolor*.

CHARLES A. HART, Champaign, Ill.

BOOK NOTICES.

HISTOIRE NATURELLE DES ARAIGNEES: Deuxième Edition, Par Eugène Simon: Librairie Encyclopédique de Roset, Paris, 1892.

The first portion of Vol. I of this most important work has just appeared (pp. 1–256). The work will be divided into four parts: 1. External Anatomy; 2. Classification; 3. Biology; 4. Geographical Distribution. Simon arranges the known spiders of the world in 41 families; three families under the suborder *Araneæ theraphosæ;* the remaining families under *Araneæ veræ;* the latter is divided into two

Digitized by Google

sections—the *Cribellatæ*, with eight families, the *Ecribellatæ*, with thirty families. This portion of Vol. I. contains the External Anatomy and the classification of the *Araneæ theraphosæ* and the *Cribellate* section of the *Araneæ veræ*. The text is illustrated with outline figures. There is no key to the families, but under each family there is a key to the genera, after which follow descriptions of the genera and various remarks. The descriptions of the genera and the keys are in Latin ; the rest in French. Although the classification will, of course, change from time to time, this work will be for many years to come a most important work for arachnologists, and should be found in every college library throughout the world. —N. B.

A Synonymic Catalogue of Lepidoptera Heterocera (Moths) by W. F. Kirby, F. L. S., F. E. S., etc., etc.: Vol. I., Sphinges and Bombyces. London: Gurney and Jackson, 1 Paternoster Row: 1892.

This forms a large volume of 950 pages, including the Sphinges and Bombyces of the world, and brought down to May 1, 1892. There are twenty-nine families recognized, of which the Sphingidæ form the twenty-first, preceded by the Notodontidæ and followed by the Bombycidæ. The Castniidæ head the list, including as the only North American species, the genus Megathymus, heretofore classed among the butterflies. The genus Lagoa, which Dr. Packard has recently proposed should form the type of a new family, is placed in the Liparidæ, between Parorgyia and Orgyia, a most peculiar location. A number of names, long since referred to the synonymy, reappear under their original generic titles in a very misleading manner, as, for example, *Arctia bimaculata* Saunders, placed between *A. f-pallida* Stets. and *A. Nais* Dru., in the genus Apantesis Walk. One would hardly look for *Crocata quinaria* here. On page 36 is a curious error, whereby the noctuid genus *Euedwardsia*, Grote, proposed for *Xanthotrix Neumoegeni*, Hy. Edw., is made to stand for *Edwardsia brillians*, Neum. As both generic names are thus pre-occupied, the Agaristid genus may be known as *Eupseudomorpha* But errors of this kind are hard to avoid in a work of the size of this one ; and the arrangement of the moths of the world under a uniform system of classification makes possible a revision of our North American species to correspond with it. The correction of certain errors in the location of species, with which Mr. Kirby is necessarily autoptically unacquainted, can easily be made, and Mr. Neumoegen and myself have already started on this work.

Harrison G. Dyar.

Mailed January 5th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, FEBRUARY, 1893. No. 2.

CANADIAN HYMENOPTERA—No. 2.

BY W. HAGUE HARRINGTON, OTTAWA.

COLEOCENTRUS CANADENSIS, n. sp.

Female.—Length, 20 mm. Black, with red legs. Head transverse, as wide as thorax; cheeks as wide as eyes; face slightly swollen below antennæ, clothed with short pubescence, and with the inner orbits faintly yellowish below; palpi and inner edges of mandibles and labrum rufous; vertex and cheeks polished, the area of the ocelli without noticeable depressions or sutures; antennæ long and moderately thick, the joints about forty and subsequal. Thorax polished above; the lobes of the mesothorax prominent, the central sulcate; pleuræ and pectus rugose or subaciculate, but without definite striæ; scutellum moderately large and elevated; metathorax with acute carinæ; the area enclosed by the two discal carinæ about twice as long as wide; in the area enclosed by the two lateral carinæ the elongate spiracle may be plainly seen almost in centre; the areas between lateral and discal carinæ transversely rugose; legs slender with robust coxæ, entirely rufous with exception of hinder tibiæ and tarsi, which are somewhat brownish; wings faintly yellowish, stigma and nervures brown, areolet small, triangular and pedicellate, receiving the recurrent nervure at outer angle. Abdomen sessile, robust, brown rather than black: first segment twice as long as wide, not much expanded posteriorly, faintly sulcate above, with indistinct lateral carinæ; remaining segments shorter, subequal, margined at apex (except last) with pale yellow; the terminal segment compressed and curved so as to partly embrace the ovipositor; ventral scale very large, partly covering three apical segments; ovipositor as long as body, piceous, the sheaths piceous black, very finely pubescent.

Captured at Casselman, about thirty miles south-west from Ottawa, on the 26th June, 1883.

Digitized by Google

I have much pleasure in describing this insect, as the species of Coleocentrus are rare in collections. All the American forms have been described from Canada, and so far these insects seem to have been found, with one exception, only in our territories.

During a visit to Sudbury, on the 16th of last June, with Mr. Fletcher, we were so fortunate as to take five examples of the fine species described by Mr. Cresson in Vol. I., page 35, of the CANADIAN ENTOMOLOGIST, and named after Mr. Pettit. I find no record of its occurrence during the score of years which has since elapsed, and the two females taken by Mr. Fletcher and the three males which I secured are therefore highly prized. The females were flying near the ground among the fallen timber, upon which they were also seen to alight, and in addition to those captured two or three escaped owing to the rough nature of the ground. The males were hovering about bushes, and were not at first recognized as belonging to this genus, as they differ so much in the shape of the abdomen and in method of flight. A female was also taken by Mr. Evans during our stay with him. As the male has not been described, if indeed previously captured, I append its description in such characters as it differs from the female.

COLEOCENTRUS PETTITII, Cress.

Male.—Length, 17 to 20 mm. Black, shining. Face below antennæ, scape of antennæ beneath and palpi yellow. Antennæ black, nearly as long as the body, the joints both longer and more numerous than in ♀. Legs varying slightly in colour but much paler than those of ♀; the anterior and middle legs, including the tips of coxæ, are almost yellow, as also the posterior tarsi; posterior femora and tibiæ pale rufous, with a more or less defined black stripe down the tibiæ behind. Abdomen slender and compressed laterally, as in some Ophionids; the first segment much narrower than in the ♀; the apex of the last dorsal segment shaped as in ♀.

The posterior tibiæ of the females are not black as in the specimen described by Cresson, but rufous or brownish with a black line externally, as in the ♂.

Our species may be tabulated as follows:—

Head, thorax and abdomen mostly rufous..... *C. rufus*, Prov.

Head and thorax black; abdomen black or brownish.

Antennæ with yellowish annulus..... *C. mellipes*, Prov.

Digitized by Google

Antennæ black.

Legs, including coxæ, brownish fulvous . *C. occidentalis*, Cress.
Legs rufous, coxæ black..... *C. Pettitii*, Cress.
Legs rufous, coxæ rufous..... *C. Canadensis*, n. sp.

Of the above species, *occidentalis* is recorded from Vanc. Island, and has been taken in California by Mr. Koebele; *mellipes* from the Rocky Mountains; *rufus* from Quebec (?), and *Pettitii* and *Canadensis* from Ontario.

Another fine genus of the Pimplinæ is Ecthrus, the species of which in general appearance much resemble those of Coleocentrus. The females, however, may be readily distinguished by the absence of the large ventral scale, and by their inflated anterior tibiæ. The shape of the areolet and of the last dorsal segment of the abdomen will separate the males.

ECTHRUS RUFOPEDIBUS, n. sp.

Female. Length, 20 mm. Black, with red legs. Head entirely black; face rugosely punctured and opaque; cheeks and vertex polished, but distinctly punctate; labrum and mandibles polished; palpi black; antennæ long and slender; third, fourth, and fifth joints long, subequal, a white annulus extending from middle of sixth joint nearly to apex of tenth. Thorax immaculate; lobes of mesothorax prominent, polished and punctate, as is also scutellum; pleura and metathorax coarsely rugosely sculptured, posterior transverse carina of metathorax distinct, but areas of disc not clearly defined; wings sub-hyaline, nervures and stigma black, areolet large, pentagonal; coxæ, trochanters and femora rufous, front tibiæ inflated, white, their tarsi almost rufous, middle tibiæ and tarsi brownish, the posterior tibiæ and tarsi black. Abdomen stout, basal segments strongly punctured, the first without distinct carinæ; ovipositor as long as body, rufous, sheaths black, scarcely pubescent.

This fine species was captured by Mr. Winn at Montreal on the 14th June, 1890.

I have prepared the following table for convenience in separating the twelve species of the genus.

FEMALES.

Wings smoky..... *E. ? maurus*, Cress.
Wings banded.
Legs rufous..... *E. nubilipennis*, Cress.
Legs black..... *E. luctuosus*, Prov.

Digitized by Google

Wings hyaline, or subhyaline.
Abdomen red.....*E. abdominalis*, Cress.
Abdomen red and black.....*E. Provancheri*, Prov.
Abdomen black and white.....*E. pediculatus*, Prov.
Abdomen black.
Antennæ brown, anterior coxæ black...*E. rubripes*, Prov.
Antennæ black, anterior coxæ red.. .*E. nigricornis*, Prov.
Antennæ annulate with white.
Ovipositor long.
Legs black.. .....*E. niger*, Cress.
Legs red.....*E. rufopedibus*, n. sp.
Ovipositor short.
First abdominal segment carinate,
. .....*E. annulicornis*, Walsh.
First abdominal segment not carinate,
.....*E. canadensis*, Prov.

MALES.

Abdomen red..... .....*E. abdominalis*, Cress.
Abdomen black.
Legs black..... .....*E. niger*, Cress.
Legs red.....*E. nigricornis*, Prov.

Two of the species are described from the United States, viz., *annulicornis* from Illinois and *nubilipennis* from the Rocky Mountains in Colorado. Ottawa has furnished two, viz., *niger* and *abdominalis* communicated to Mr. Cresson by the late Mr. Billings, and described in CAN. ENT., Vol. I., page 37. Of the former of these, *niger*, I have taken 4 ♀ and 1 ♂, and have found the female ovipositing in decaying maples in June. Provancher also records this species from St. Hyacinthe, Que. The second, *abdominalis*, I have not succeeded in finding here yet, but I was so fortunate as to take a fine female at Sudbury on the occasion of the visit already mentioned. I have also received this species from Rev. G. W. Taylor, of Victoria, B.C., and his specimen agrees in every particular with that from Sudbury. The species *maurus* (doubtfully referred to this genus by Cresson) was described from Victoria, and *Provancheri* was also obtained by Mr. Brodie from Vancouver. The species now described, *rufopedibus*, is from Montreal, and the remaining species, all described by Provancher, are presumably also from the Province of Quebec.

Digitized by Google

SYNOPSIS OF THE ASILID GENUS BLACODES.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

Up to the present time but a single species of *Blacodes* has been described from the United States: *B. bellus*, Loew, from Texas. I give herewith descriptions of three other species, and present a table to aid in identifying them :—

1 Wings largely hyaline, abdomen and femora black 2
Wings black, abdomen and femora red .....*bellus* Lw.

2 Thorax destitute of a crest of hairs, scutellum bearing only two bristles, tibiæ yellow 3
Thorax furnished with a crest of hairs, scutellum bearing four bristles, tibiæ black .....*cristatus*, n. sp.

3 Anal cell open, second submarginal cell appendiculate .....*truncus*, n. sp.
Anal cell closed, second submarginal cell not appendiculate .....*clausus*, n. sp.

Blacodes cristatus, n. sp., ♀.

Wholly black, the tibiæ slightly piceous. Head light gray pollinose, that in middle of the front dark brown ; face moderately convex, mystax black and white, very dense and extending nearly to the antennæ; first joint of antennæ slightly longer than the second ; third joint lanceolate, three times as long as the second joint ; style slender, slightly over half as long as the third joint. Thorax very convex, gray pollinose and marked with a broad blackish-brown geminate median stripe, which is considerably dilated outwardly behind the middle ; on each side of this stripe is a broad, irregular, blackish-brown stripe extending but little in front of the middle of the dorsum ; the median brown stripe bears numerous black and light yellow pile, which, on the anterior portion, forms a nearly erect crest ; bristles of thorax black and light yellow ; pleura mottled light gray and dark brown pollinose, the pile white ; the fan-like row of bristles in front of the halteres is white. Scutellum brown pollinose and densely white pilose, the four marginal bristles black. Metanotum shining black, a large silvery white spot each side. Abdomen shining bluish-black, marked with light gray pollen as follows : A spot on sides of first segment, a transverse anterior and two posterior lateral

Digitized by Google

oblique spots on each remaining segment, the anterior spot obsolete on the last two segments, the posterior spots uniting with the gray lateral margin except on the second segment, each extending obliquely inward from the posterior angle of the segment and reaching at least a third of the distance across the segment, those on the sixth segment united; pile of dorsum very short, sparse, depressed, mostly light yellowish, that of the sides and venter longer and white. Pile of legs white, the bristles light yellow; front and hind tibiæ and their metatarsi densely bright yellow pubescent within; spur of front tibiæ rather slender, middle tibiæ also furnished with a strong, nearly straight black spur at the tip within. Wings pure hyaline, the extreme apex gray, a large brown cloud on veins at bases of the first and second submarginal cell, of each posterior cell and of the discal cell; all posterior and the anal cell open, second submarginal cell destitute of a stump of a vein. Halteres black. Length, 11 mm. Ventura County, Cal. A single specimen, in April.

Blacodes truncus, n. sp., ♂ ♀.

Same as *cristatus*, described above, with these exceptions: Tibiæ, extreme apex of femora, and base of each joint of the tarsi, yellow. Pollen of front light gray, mystax very sparse, white; third joint of antennæ almost linear, nearly four times as long as the second. Thorax destitute of a medium crest of pile, scutellum not densely pilose, bearing only two marginal bristles, metanotum uniformly gray pollinose, destitute of silvery spots. Pollen of abdomen, consisting of an anterior cross band on each segment, dilated each side so as to reach the posterior angle of the segment. Brown clouds on wings very faint; base of second submarginal cell furnished with a long stump of a vein. Halteres yellow. Length, 9 mm. Los Angeles County, Cal. Two males and two females.

Blacodes clausus, n. sp., ♂ ♀.

Differs from *truncus* only as follows: In the female the pollen on the abomen is much more extended, covering nearly the entire dorsum, but in the male it is confined to the anterior end and sides of each segment, that on the sides being greatly dilated inward at the posterior corner of each segment. Base of second submarginal cell destitute of a stump of a vein; anal cell closed and short petiolate; brown clouds of wings obsolete or wanting. Length, 7 to 9 mm. Orange County, Cal. Three males and six females.

Digitized by Google

NOTES ON SOME INJURIOUS INSECTS OF TEXAS.

BY F. M. WEBSTER, WOOSTER, OHIO.

The following fragmentary contributions to a knowledge of a few of the destructive insects of this most interesting State are given here, not so much on account of their present individual value, as for the purpose of drawing attention to the riches in store for the entomological worker who may drift within its borders. In new countries travellers, in passing through, blaze or bark a tree here and there along the way to guide those who may follow after. These notes may be but blazes, but if they prove of aid to others in the future, they will have served their mission. The major portion of the material for this notice has been sent me from time to time by my friend, Prof. Geo. W. Curtis, of the A. & M. College, while others have been received from various other correspondents. To these I have occasionally added some of my own observations, when they seemed to augment the value of those made by others.

Early in May I received a number of twigs of Fig, in which were burrowing numerous larvæ and adult beetles. Of these last there were *Amphicerus bicaudatus*, Say, *Trogoxylon parallelopipedum*, Mels., and a single *Sinoxylon basilare*, Say. The *Trogoxylon* have continued to appear throughout the summer up to date (Sept. 29), while one of the larvæ of *Sinoxylon* has only transformed to an adult within the last few days. As I saw adults on Mesquite, burrowing into the wood, in Llano County, in March,* it would appear that their season of appearance is somewhat protracted, especially as I have since reared them from this same lot of Fig twigs in May, June, August and September.

In April, specimens of *Blapstinus auripilis*, Horn, were sent me from the vicinity of Galveston, where they were said to be destroying watermelon vines, the beetles being found in great numbers on the ground beneath the vines, while the plants withered and died. The beetles were alive when received, and, having no melon vines, I placed them on cucumber, which they refused, but ate the young plants of *Polygonum* which were growing among them. The accusation in regard to the destruction of melons, however, will need to be sustained by further observation, as they might have died from some bacterial or other disease, the beetles, though present, having nothing to do with the disease.

Chinch bugs, *Blissus leucopterus*, Say, were reported abundant in the central southern portion of the State in April, but I have no information

*Insect Life 3, 454.

Digitized by Google

of any serious depredations later in the season. An attack on Alfalfa was reported, but, unfortunately, the cause of the trouble was lost in transit, and I can only suspect, from the nature of its work, that it was some species of lepidoptera, probably a Pyralid, though I hardly think it could be *Eurycreon rantalis*. The method of attack on Alfalfa resembles that of the Parsnip web-worm, *Depressaria heracliana*, De G., on parsnip, in that the terminal leaves and stems of the plant are drawn together and held by a web, and within the enclosure thus formed the caterpillar evidently lives, feeding from the tender growth, thereby dwarfing the plants. Prof. Townsend, of Las Cruces, New Mexico, writes me of reports of similar injury in that section of the country, but he has not yet been able to secure specimens of the depredator.

Considerable injury to the Pecan was reported, and specimens of the depredator were sent with samples of the injured Pecans. But, again, the pests escaped, probably to the mail sack, that bourne from which no entomologist's treasures ever return. The worms were reported as causing the shuck enveloping the nut to mould and drop off the tree before they were full grown, thereby rendering them valueless. In Insect Life, vol. 4, p. 78, mention is made of a probably undescribed species of Phycitid, whose larvæ are said to attack the buds of Pecan in early spring. These were sent from the vicinity of Brownwood, Texas, June 17, while the specimens intended for me were collected with the injured nuts, September 14. Whether or not there is any connection between the two remains to be learned.

The Angoumois Grain Moth, *Sitotroga (Gelechia) cerealella*, Oliv., is an every year pest, both in the field and among stored grain. My old experiments, with heat, made ten years ago, and before the use of carbon bisulphide came into application in destroying grain-infesting insects, are less practical than is the use of this fluid drug. The same measure may be used against the Rice Weevil, *Calandria oryzæ*, which appears to be especially abundant among stored corn, and is, so far as my correspondence and personal observation goes, the grain weevil of Texas.

The Bag Worm or Basket Worm appears to be exceedingly numerous the present season in various portions of the State, and the same may be said of Southern Ohio. Of five sent me from Texas, August 11, and placed on trees in my yard, four soon clustered together and spun their fastenings to the same twig, while the fifth amused me by wandering about in a dissatisfied sort of way, and finally going off by itself to an adjacent limb, to which it immediately attached itself permanently.

Digitized by Google

THE LARVÆ OF THE CLISIOCAMPÆ.

BY HARRISON G DYAR, ROXBURY, MASS.

As has been shown by Mr. R H. Stretch, the North American species of Clisiocampa are best separated by larval characters, and this paper will deal chiefly with them. I refer to Mr. Stretch's paper in volume I. of Papilio, which contains about all that has been known regarding the species.

There are two pretty well defined groups. The first contains *C. disstria*, *C. erosa* and *C. thoracica*, and the second the remaining species. The first are not nest-spinning species; the larvæ rest in bunches on the trunk without covering. The second, with the possible exception of *C. constricta*, of which I have seen no nest, and of *C. incurva*, the larva of which is unknown, are all nest-spinning. Their webs are formed in forks of the smaller branches or twigs, as in the well-known *C. americana* of the Atlantic States. The Eastern region, from the eastern slope of the Rockies to the Atlantic, has two species, one belonging to each group, namely, *disstria* and *americana*. The Pacific Northwest, from the Cascade Mountains to the Pacific, has also two, one to each group, viz., *erosa* and *pluvialis;* but the latter, which takes the place of *americana*, is not its representative, as *erosa* is of *disstria*. The central arid region has but one species at present known to me, unless *incurva*, described from Arizona, be found throughout the range of *fragilis*. *C. fragilis* is the only species not a tree feeder, and this habit has evidently been induced by the absence of deciduous trees in its habitat. California has four species, all endemic, unless it be that *thoracica* is the same as *erosa* of Oregon. Prof. Rivers's description recalls *erosa* most vividly, but he makes no mention of the broad subdorsal blue band so distinct in the larva of *erosa*.

§1. Group *disstria*.

CLISIOCAMPA DISSTRIA, Hübner.

1797---Smith & Abbot, Lep. Ins.,Ga., n. 117, tab. LIX. (as *P. neustria.*)

1816—Hübner, Verz. Bck. Schm., p. 192, No. 1975.

1889—Hy. Edw., Bull. 35, U. S. N. M. (26 references).

sylvatica, Harris.

1841—Harris, R. Ins., 271.

drupacearum, Boisduval.

1869—Boisd., Ann. Ent. Soc. Belg., xii., 82.

Digitized by Google

Larva.—Black, with ten elliptical white spots on the back, one on each segment, except at the extremities ; a sub-dorsal reddish line ; lateral area largely blue gray, becoming paler below.

Food-plants.—Various forest trees, witch-hazel (Hamamelis), etc.

Habitat.—The Eastern region, from the Mississippi valley to the Atlantic.

[The above description is from notes made several years ago, and is not sufficiently full.]

CLISIOCAMPA EROSA, Stretch.

1881—Stretch, Papilio, i., 67.

1883—Stretch, Papilio, iii., 20 (as larva No. ii.)

Larva.—Head bluish-gray, with small black spots ; hairy ; labrum whitish. Body black,a row of white or orange-tinted dorsal spots,two on each segment, rounded, the posterior one the smaller. In the dorsal space are several supplementary, narrow, orange-red lines, sometimes partly filled in with blue. An orange-red subdorsal line narrowly separated by a black line from a broad blue band, minutely black dotted ; a narrow black line ; a lateral orange-yellow line; below this blue-gray, with traces of a broken yellowish substigmatal line and one along the bases of the legs. Hair, thin dorsally, faintly reddish ; short and dense from the subventral region, silky white with some dusky and reddish hairs intermixed. On joints 3, 4 and 12 the blue subdorsal band is broken by a quadrate black patch, and incised on the other segments.

Food-plants.—Oak, alder, poplar, willow and fruit trees.

Habitat.—The Pacific Northwest.

CLISIOCAMPA THORACICA, Stretch.

1881.—Stretch, Papilio, i., 68.

1889—Rivers, Proc. Cal. Acad. Sci., ser. ii., vol. i., 105.

Larva.—Prof. J. J. Rivers says:—"Body obscure brown ; dorsal ridge ornamented with a row of conspicuous ochre coloured spots, two spots on each segment, the one placed in front always much the larger; the spots are attended by numerous short waving lines of reddish brown, running longitudinally, and there is a subdorsal line of the same colour and a spiracular line of a much lighter shade. Its whole length, above the feet, is occupied with numerous tufts of grayish hairs."

Food-plants.—Willow and fruit trees.

Digitized by Google

Habitat.—San Mateo Co., (Stretch); Berkeley, Cal. (Rivers). If Prof. Rivers's determination of the moth is correct, and I see no reason to doubt it, then the name may have to fall as a synonym of *C. erosa;* for the larva is so much the same that there does not seem to be anything in the description to separate it by, unless the subdorsal blue band be really absent.

§2. Group *americana.*

CLISIOCAMPA AMERICANA, Harris.

1797—Smith & Abbot, Lep. Ins., Ga., n. 119, tab. LX. (as *P castrensis.)*

1841—Harris, Cat Ins., Mass., 72.

1889—Hy. Edwards, Bull. 35, U. S. Nat. Mus., 77. (32 references.)

decipiens, Walker.

1855—Walk., Cat. Brit. Mus., vi., 1488.

frutetorum, Boisduval.

1869—Boisd., Ann. Ent. Soc., Belg., xii., 82.

Larva.—Head black, pilose, a few long black hairs ; bases of antennæ and labrum white. Body black with a narrow white dorsal line on joints 3-12, fainter posteriorly and speckled with black. An orange coloured subdorsal band, rather irregular and a little mottled with black. Below this a subdorsal row of blue dots, two on each segment, elongate, the anterior one longitudinal, the posterior transverse. Above and below them is an interrupted orange-tinted line, and below this the lateral area is mottled with pale blue, becoming brownish in the subventral space. Hair reddish brown, most abundant subventrally.

Food-plants.—Wild cherry and fruit trees.

Habitat.—Florida to Canada : west to the Mississippi Valley.

CLISIOCAMPA CONSTRICTA, Stretch.

1874—Hy. Edwards, Proc. Cal. Acad. Sci., v., 368.

1881—Stretch, Papilio, i., 66.

strigosa, Stretch.

1881—Stretch, Papilio, i., 67.

1892—Dyar, Psyche, vi., 326, *pr. syn.*

Larva.—Head powdery blue, with black mottlings ; mouth black, lower part of clypeus white ; antennæ white ringed. Body black, densely

Digitized by Google

covered with powdery blue over the whole lateral region up to and including the subdorsal blue dots, and leaving only a few black mottlings and a subquadrate black patch on each segment laterally, bordered below by an orange dash. Below the spiracles, the blue becomes nearly white, and anteriorly on the segments tufts of silky white hair grow from the skin. Traces of a subventral orange shade. Dorsum black without a dorsal line, the usual pair of orange subdorsal lines narrow and irregular, heavier at the posterior part of each segment. Considerable conspicuous orange tinted hair grows on the back.

Food-plant.—Oak *(Quercus Kelloggii).*

Habitat.—The more hilly parts of California.

CLISIOCAMPA AMBISIMILIS, *nov. sp.*

Larva.—Head pale blue, with numerous black spots especially at the vertex; labrum and basal joints of antennæ yellowish-white; many white hairs. Body black, largely mottled with pale blue-gray at the sides and a series of subdorsal blue dots, two on each segment, the posterior one of which is produced downward into a transverse dash reaching the lateral blue region. A dorsal bluish-white line, much broken, but irregularly so; in some specimens it is continuous from joint 3 posteriorly, in others widely broken in the segmental incisures or entirely absent. A subdorsal series of waved, broken, orange lines, triple or quadruple on the posterior part of each segment, single anteriorly. A paler broken lateral line just above the blue area. Hair quite dense, keeled slightly dorsally and tufted laterally, red on the back, but silky white on the sides, as in *C. constricta.*

Food-plants.—Fruit trees.

Habitat.—Santa Cruz Co., California.

This species occurred to me abundantly on fruit trees at Watsonville, Cal., but the native food-plant was not determined. The larvæ are closely related to *C. constricta*, differing in the presence of the dorsal line (though this is not constant) and in the greater restriction of the lateral blue area, which does not extend up to and enclose the subdorsal dots, as it does in *C. constricta.* The moths are very different. The ♂ is rusty brown, with two pale lines, the ♀ pale brown, with two darker lines. My specimens are too poor to enable me to give characters to separate the moths from *C. californica*, which they much resemble; but the larvæ are abundantly distinct. Besides the marked difference in markings, the contrast in the colour of the lateral hairs of the two species is striking. Dr. Packard has

Digitized by Google

probably confounded this species, as well as *C. fragilis*, with *C. californica* in the 5th report of the U. S. entomological commission.

CLISIOCAMPA CALIFORNICA, Packard.

1864—Packard, Proc. Ent. Soc. Phil., iii., 387.

1877—Packard, Inj. Ins. West, 807.

1881—Stretch, Papilio, i., 64.

1890—Packard, 5th Rept. U. S. Ent. Com., 120.

pseudoneustria Boisduval.

1869—Boisd., Ann. Ent. Soc. Belg., xii., 82.

Larva.—Head black, very hairy except where the ocelli are, sometimes tinged with powdery blue in front; labrum whitish. Body entirely black, except the tips of the abdominal feet, which are pale, covered with long, fulvous hair, quite thick, especially dorsally, where it is keeled, and laterally, where it is tufted anteriorly on the segments. Almost entirely without marks; some have an irregular red subdorsal line, interrupted between the segments and narrowly centrally on each segment, mottled with the ground colour; while all have a series of subdorsal small blue dots below the red line, only one on each segment, and sometimes a lateral series of red dashes. In some even the blue dots are obscure and wanting on the central segments.

Food-plants.—Oaks (*Quercus agrifolia* and *Q. lobata*).

Habitat.—The coast region of California.

Dr. Packard has confounded *C. fragilis* with this species, if not others also, and consequently gives it a habitat much too extended. *C. fragilis* is abundantly distinct from *C. californica* in the larva, and, though the ♂ moth is very similar, the ♀ shows good specific differences.

CLISIOCAMPA FRAGILIS, Stretch.

1881—Stretch, Papilio, i., 64.

1888—Hy. Edw., Ent. Amer., iv., 62.

1890—Packard, 5th Rept. U. S. Ent. Com., 120 (as *C. californica.*)

Larva.—Head blue gray, dotted with black, mouth and ends of antennæ black, labrum and bases of antennæ sordid white. Body with the ground colour black, a broad pale blue dorsal band, broken at the segmental incisures and narrowed a little at both ends of each segment, absent on joints 2 and 13. Orange subdorsal marks much reduced, scarcely noticeable, consisting of from one to three narrowly linear, waved and broken streaks. Subdorsal blue dots, two on each segment, very large, subquadrate, either separate or confluent on their upper sides,

Digitized by Google

or also confluent with the lateral blue-gray area, but always leaving a row of black patches, one in the middle of each segment. A faint, lateral, pale orange or whitish line, broken and bordering the black patches below. Below this line to the legs, blue-gray, mottled with black, with traces of a whitish substigmatal line and one along the bases of the legs. Venter black, immaculate. Thoracic feet black, the abdominal ones pinkish at tips. Hair moderately abundant, faintly reddish tinged on the back, white on the sides, but rather thin and not tufted.

Food-plants.—Wild gooseberry (Ribes) and rose (Rosa.)

Habitat.—Nevada, Montana, Wyoming, Colorado, and probably all the arid region from the eastern slope of the Rockies to the Sierra Nevada and Cascade Mountains.

CLISIOCAMPA PLUVIALIS, *nov. sp.*

1883—Stretch, Papilio, iii, 20 (as larva No. 1).

Larva.—Head hairy, bluish-gray, spotted with black, the spots segregating on the vertex, or covering nearly the whole head; labrum and bases of antennæ yellowish white. Body black, a pale blue dorsal line, divided between the segments, obsolete at the extremities, and forming 9 rather narrow, elongate, blue spots tapering at their ends, exactly as in *C. fragilis.* A subdorsal row of blue dots, two on each segment, the anterior one the smaller, and not reaching quite so far down. Between these is an orange band, starting in a small spot on the anterior part of each segment and either broken or connected with a broad triangular widening of the band on the posterior part. A distinct, broad, but rather irregular, pale orange, lateral band, narrowly broken here and there, and containing a few black dots. Below this, a slight suffusion of blue, mottled with black, and a diffuse and mottled pale orange substigmatal band, besides another along the bases of the legs. Below, black, with a double diffuse and mottled bluish band, or the venter all mottled with bluish white. The subdorsal orange band is very conspicuous. It may extend from near the dorsal line to below and behind the subdorsal blue spots and also in front of them, but is usually less on the anterior part of the segments and always retracted centrally. Its dorsal edge is well defined, a little curved on each segment, following the outline of the pieces of the dorsal band, but always separated from them by a black space, though it sometimes nearly surrounds them by connecting over the dorsum with the band on the other side, posteriorly on the segments. In some examples the region below the subdorsal band to the venter is largely overspread

Digitized by Google

with orange, mottled with the ground color, most heavily just below the subdorsal band. Hair not thick, reddish, both on the back and sides.

Food-plants.—Alder *(Alnus)*, apple, etc.

Habitat.—The Pacific Northwest, from the Cascade range to the sea. Found abundantly at Seattle, Washington, and rarely at Portland, Oregon.

The moths do not differ from Stretch's description of *C. fragilis*, except that in the ♀ there is no broad, brown band on the forewings, but a diffuse shade outward from the inner dark line; in some specimens also bordering the undulated pale outer line. A larger series of specimens than I possess will probably show further differences, though the species is closely related to *C. fragilis*.

CLISIOCAMPA INCURVA, Hy. Edwards.

1882—Hy. Edw., Papilio, ii., 125.

The larva of this species is unknown. I have examined the moths in the collection of Mr. B. Neumoegen, and they seem closely allied to *C. fragilis*. They differ from any other species of this group in that both sexes are pale. The male is suffused with brown on the forewings, the lines pale, bordered inside with brown, so that in pale specimens the lines look brown. The female is the same, but browner, so that the lines are always pale, the outer waved, the inner sometimes rather faint, so that its brown edge is the more distinct. In both, the brown is deeper between the lines than outside them. I am not inclined to give much weight to the character from which the species was named. *Clisiocampa*, like *Datana*, cannot be separated by the position or shape of lines, but by the difference in the relative coloration of similar markings. In *Clisiocampa*, both sexes are needed for a determination. The following table will separate the larvæ here described. *C. incurva*, only, is unknown.

§1. A dorsal row of rounded spots.
One spot on each segment, - - - *disstria*, Hbn.
Two spots on each segment.
A broad, distinct, subdorsal blue band, - *erosa*, Str.
No distinct subdorsal band? - - *thoracica*, Str.

§2. A dorsal line, continuous, broken or absent.
A continuous, narrow white line, - *americana*, Harr.
Dorsal line, if present, not white; often absent.
Line irregularly broken or absent.
Lateral region heavily blue shaded.

Digitized by Google

Blue inclosing the subdorsal dots, *constricta*, Str.
Blue not reaching the dots, *ambisimilis*, Dyar.
Lateral region with no blue shade, *californica*, Pack.
Line forming a row of elliptical blue spots.
A slight subdorsal orange band, - *fragilis*, Str.
A heavy orange band, - - *pluvialis*, Dyar.

ASTATUS BICOLOR, SAY.

BY WILLIAM J. FOX, PHILADELPHIA.

In reply to Mr. Charles A. Hart, who has shown, in the last number of this journal, that in his opinion I am in error regarding the identification of *Astatus bicolor*, Say, I would say that the stigma of the ♂ only is "yellowish-rufous", while that of the ♀ varies from reddish-black to deep black. If he will again consult my synopsis of the genus Astatus he will find that I used the words "stigma of wings black" in separating those of the female sex. In regard to my new species, *A. pygidialis*, which Mr. Hart suggests may be an extreme variety of *bicolor*, it differs not only in the slight characters mentioned by him, but also in the shorter and triangular pygidium, and the more feeble armature of the legs; the scutellum is not furrowed down the middle, and the insect itself is much smaller. Although it *might* prove to be but a variety of *bicolor*, nevertheless a series of nineteen specimens of that species and three of *pygidialis* show no intergradation, and therefore I think I was justified in describing it as new. I would rearrange the synonymy suggested by Mr. Hart as follows:

ASTATUS BICOLOR, Say.

A. bicolor, Say. Lec. Edition, I., p. 166, ♀ ♂.
A. rufiventris, Cress. Tr. Am. Ent. Soc., IV., p. 218, ♀.
A. terminata, Cress. ibid., p. 218, ♂.

A. PYGIDIALIS, FOX.

A. pygidialis, Fox. CAN. ENT., XXIV., p. 234, ♀.
A. bicolor, Hart, (not Say). ibid., XXV., p. 27.

Digitized by Google

NOTE UPON THE REVISION OF THE GENUS CUCULLIA.

BY AUG. R. GROTE, A. M., BREMEN, GERMANY.

The "Revision of the Genus Cucullia," by Prof. Smith, in Proc. U. S. Nat. Mus., XV., pp. 33, *et. seq.*, raises the number of described North American species to 14, and is an interesting addition to the knowledge of our *Noctuidæ*. Larger collections from the west have come to hand since my study of the species and have admitted of fuller comparisons. Although the species of *Cucullia* are not among the commonest Owlet Moths and seem to fall less easily a prey to the collector's efforts than those of many other genera, still we may conclude that the above figures give, at least approximately, the N. American representation of the genus. In a comparison of the faunæ of Europe and North America* I have sought one distinction in the smaller representation of the Hooded Owlets in America. Whereas in other leading genera, such as *Apatela (Acronycta), Hadena, Mamestra, Agrotis, Oncocnemis, Lithophane, Plusia, Catocala*, the North American species are much the more numerous; in *Cucullia* the proportion is reversed, and we have only 14 American to 43 European species of the genus. Of a truth we seem to have only 12 species which represent structurally the European forms. Two of our species *(bistriga* and *serraticornis)* I have no doubt (from figures and descriptions, as well as my own observations upon the Californian form) will come to be separated generically, or at least subgenerically, from the rest. There appear to be no analogues to these two species in the European fauna.

It is noteworthy that our North American species belong, in the main, to the groups represented in Europe by *Blattariæ, Asteris* and *umbratica*. No North American representative of the group of *Scopariæ* appears to be known, and, in particular, the silvery group containing *argentea* is wanting with us. Our western plains have this in common with the Russian steppes that they produce *Heliothini* in abundance, and when the description of *Cucullia luna*, Morrison, appeared, I was induced to believe that we had also found an American silvery species of *Cucullia*, allied to *argentina* from Astrachan or *splendida* from the Ural and Altai. But it now appears that this species of Mr. Morrison's is my *Epinyctis notatella*, a genus referred by me originally to the white Heliothians, among such forms as *Pippona* and *Antaplaga*, and where, from its structure, I believe still it most naturally belongs. At nearly the same time the moth was

*See Grote: "Die Verwandtschaft," etc., Verh. Gesell. Deutsch. Naturf., 2tei Theil, pp. 148–154, Leipzig, 1890.

Digitized by Google

published by Prof. Smith as a new genus, but "closely allied to *Cucullia*," under the name of *Nyctophœata*. These facts, which are of interest in a comparison of opinions upon one and the same Noctuid, are obscured by Prof. Smith's brief statement that "the species described as *luna* by Mr. Morrison is an Heliothid", l. c. p. 37. According to Smith, Bull. Br. Ent. Soc. 45, it "should stand between *Cleophana* and *Cucullia*".

If, then, we really possess a silvery *Cucullia*, it has yet to be discovered. Such a form must be looked for in the west, in the States and Territories adjoining the Rocky Mountains, and, probably, on the eastern side of the range. But not improbably such forms, so much prized by European collectors, are entirely wanting in our fauna; while, although breeding and more extended research may turn up new species, it may be concluded that we shall finally remain much behind Europe in the total number of our native species of *Cucullia*. This fact is important in a study of geographical distribution. We know too little as yet to generalize upon its probable cause. The species of *Cucullia* run often closely together and are also confined, it would sometimes appear, to single kinds of food plants. I content myself here with calling attention to the circumstance. Upon the following species I would make some notes in reference to Prof. Smith's remarks:—

Cucullia convexipennis, G. & R.

No mention, or I have overlooked it, is made in the Revision of the somewhat peculiar shape of the wings, to which this species owes its specific name. I should have been glad had I been able to note that our observations in this respect had been verified. On the whole, this seems our most striking species yet discovered.

Cucullia florea, Guen.

The specimen of this species, referred to on page 45 of the Revision as "from Dr. Lintner", was given by me, with the above determination, to Dr. Lintner when he was studying that genus, as also the types of *serraticornis*. This unique specimen, which I had determined as *florea*, agreed fairly with Guenée's figure and description, and Dr. Lintner had not recognized the species elsewhere when I gave it to him from my collection. The specimen was, I believe, from New York State, but I had lost the exact locality. I believed that I had collected it myself at a time when my attention was not especially directed to the genus. Afterwards, finding the specimen in my duplicate boxes, I determined the same with-

Digitized by Google

out being certain of its origin. This species, from its grayer colour, is readily distinguished from *postera* or *asteroides* (*i. e. star-like ?*, a queer title for the moth; the Latin name was probably meant to refer to the European *Asteris* or to the botanical genus *Aster*, a food plant for some of the species) and must be quite uncommon. I never saw a second example.

Cucullia lætifica, Lint., in Grote Check List (1875).

In describing the type of *cita*, from Arizona, I had no longer specimens of *lætifica*, from Texas, for comparison. The discovery of *montanæ*, Grote, had led me to expect new western forms of the genus, and in the present instance the sexual difference in general colour assisted my mistake. I have no doubt that the reference in the Revision is correct, and that the Texan species extends its range to Arizona. I do not know Prof. French's species, also referred here. With regard to *Cucullia solidaginis*, Behr., in Strecker, if my memory serves, I had a note upon it to the effect that it did not belong to this genus. If so, we have as yet no typical species of *Cucullia* known from California or west of the Rocky Mountain range. I must concur with Mr. Smith's remarks upon the descriptions of Behr. in Strecker.

In my opinion the *Cucullini* form a tribe of the *Noctuinæ*, sufficiently characterized by comparative characters. These consist in the elongate wings, the tapering abdomen, the fine and smooth vestiture, the hooded collar, the pencilled anal tuft, the short and unarmed legs, naked and lashed eyes. The European species have, in the group of *Scrophulariæ*, the fringes of primaries dentate. The rest, with the American forms, seem to have them even. The usually smooth larvæ are very distinctly marked, but are not easily distinguished upon the food-plant. In habit and character they resemble *Heliothis* somewhat. The flower of a purple double aster I had here, blooming in a pot on my window-sill, contained the coiled and partially hidden full-grown larva of one of the European species, which I did not discover for some days. The pupation is effected in the ground in a dense cocoon mixed with earth, the moth appearing in the spring. The larvæ, when disturbed, often make a jerking motion, reminding me of that of the Hawk Moth, *Thyreus Abbotii*. It must indeed be said that the moths are not without some resemblance to the *Chærocampinæ*.

Digitized by Google

In my Revised Check List of 1890, I have given eleven species of *Cucullia*. The list must now be changed to include the following fourteen apparently valid names :

1. convexipennis, *G. & R.*
2. montanæ, *Grote.*
3. similaris, *Smith.*
4. obscurior, *Smith.*
5. asteroides, *Guen.*
6. postera, *Guen.*
7. florea, *Guen.*
8. lætifica, *Lintn.*
9. Speyeri, *Lintn.*
10. dorsalis, *Smith.*
11. intermedia, *Speyer.*
12. cinderella, *Smith.*
13. bistriga, *Smith.*
14. serraticornis, *Lintn.*

A TRYPETID BRED FROM GALLS ON BIGELOVIA.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

A round, white, woolly gall was found on stems of Bigelovia (sp. probably *graveolens*) in several localities in western New Mexico the past summer, from June 19 to 22. Those found June 19 were old galls, and were met with near Luera Spring, in Socorro county. On June 21 the fresh galls were found in numbers near Gallo Spring. Sometimes two or three were found near each other on the same stem or twig of the plant, and in one case three galls were found joined together, forming a triple gall. On June 22 they were found extremely common west of Apache Spring, thus seeming to increase in number in a westerly direction, as did also the patches of Bigelovia, every plant of which was full of them. The last two localities are on the Pacific slope of the Continental Divide, the first locality (Luera Spr.) being to the east of the divide about 40 miles.

Many of the galls found June 22 were opened at the time and disclosed several hymenopterous pupæ which were at first taken for the gall-maker. Some also contained a small white larva, probably belonging to the hymenopteron. Most of the galls, however, contained puparia which were taken for those of a tachinid, but which were in reality the puparia of a trypetid and the original gall-maker. None of the puparia were noticed to contain the fly, and numerous galls that were picked and kept in pill boxes for several months developed no trypetids. It was later found, however, that two of the puparia extracted from the galls at this date and placed in alcohol contained the pupa within. The credit for the breeding of the fly is due to Professor C. P. Gillette, who sent me speci-

Digitized by Google

mens of the fly and gall. Several flies were bred by him from galls which he collected at Dolores, Colo., June 18, the flies issuing June 19. The following is a description of the gall made by Professor Gillette at the time :—

Galls sub-globular in form, varying from ¼ to ½ inch in diameter, and borne singly along the side of the stems of Bigelovia. They are very light in colour, being densely covered with a short white woolly hair. Beneath this fuzz the substance of the gall is greenish in colour and quite brittle. At the centre of each gall is a single larval cell containing, at this date, the puparium of some fly. From the larval cell a burrow leads to the woolly outer covering, which it never penetrates, and it cannot be seen from the outside. The galls are very common.

I have little to add to this description. The galls which I collected measure (dried) from 8 to 11 mm. in diameter, the average being about 9 mm. The wool is extremely fine in texture. As before stated, they were often approximated to each other on the same stem. Their form seems to indicate more or less plainly a bud-like growth, and they very often show the opening of the larval burrow on the outside.

I have referred this trypetid to the sub-genus *Eurosta*, Loew, because it seems to come nearest to this group of species, though it does not entirely fit the characterization. The fifth vein is not bristly, scutellum has only two bristles ; the front is what I should call very broad, perhaps not "remarkably" so ; the third antennal joint is short, but the ovipositor seems to be somewhat flattened instead of conical. The following is a description of the species :—

Eurosta (Trypeta) *bigeloviæ*, n. sp. ♀.

Wings do not resemble any figured by Loew in monographs ; they are very pale at base, rest blackish fuscous, except the white reticulations, and a slightly flavous portion near centre, and a little approximated to costa, being situated in basal portion of submarginal, distal portion of first basal and proximal portion of apical cells ; a white spot on costal margin before and just reaching the costal spine, before this an elongate transverse white spot extending from costa back to posterior (second) basal cell, and bordering on the pale basal portion of wing ; on costa in marginal cell two white spots, the inner one just beyond and at extremity of first longitudinal vein, the outer one more elongate transversely and

Digitized by Google

extending nearly across submarginal cell, the inner one wholly in marginal cell; marginal cell more or less pale, at least on costal portion; submarginal cell with a longitudinally elongate, slightly cresentic pale area in its apical portion; an elliptical, longitudinal white spot in first (anterior) basal cell at its distal two-thirds just the width of cell; a round white spot nearly in middle of widened distal portion of discal cell, a little approximated to anterior border of cell; a transversely oblique, somewhat elongated white spot in apical cell on its distal two-thirds, but little separated at its posterior end from a similar spot in distal portion of second posterior cell, which, however, reaches hind margin, where it slightly widens, these two spots having the same oblique direction pointing outward toward the hind margin of the wing; a large inverted V-shaped white spot nearly in middle of second posterior cell, a little nearer base, slightly bulged on its inner (toward base of wing) margin, and its prongs reaching hind border of wing; two smaller, quite widely separated white spots bordering on hind margin in distal portion of third posterior cell, the outer one touching fifth longitudinal vein near its extremity; a large, white spot a little before middle of third pos terior cell, extending from anterior border of cell back through fourth posterior cell to hind margin of wing; a small, rather triangular white spot in extreme basal portion of third posterior cell and nearly behind the elongate marking above referred to as bordering on the pale basal portion of the wing; anal angle broadly white, extending into the anal cell, and joining the pale basal portion; wing veins at base, including the costal vein where it borders the white spots, pale yellowish; halteres pale yellowish.

Head, including front, frontal bristles, face, antennæ, cheeks, proboscis, and palpi, pale yellowish, arista slightly darker apically and bare; occiput darker on upper central portion; eyes blackish (are probably green in life); second and third antennal joints of nearly equal length, palpi enlarged apically and tips reaching to tip of proboscis; front narrowed anteriorly, on vertex more than one-half width of head; front set on ocellar area; anterior portion of orbital margins and vertex with short pale yellowish bristles, including a row on each side descending obliquely inward from vertical angles, meeting in centre and forming a V, also with a pair of long, nearly erect bristles on vertical margin, and three shorter, sub-appressed, inwardly directed pairs on anterior orbital margins. Thorax blackish, dorsum and pleuræ, including scutellum, thickly set with short,

Digitized by Google

pale yellowish bristles, some long yellowish bristles on pleuræ and posterior dorsum of thorax, and a long pair arising from sides of scutellum; scutellum blackish at base, pale yellowish on margin and apex. Abdomen rufous or dark fulvous, anal segment black, ovipositor rufous. Legs entirely pale yellowish.

Length of body (incl. ovipos.), 5 mm.; of wing, nearly 4½ mm.

Described from one specimen bred by Professor C. P. Gillette from galls collected at Dolores, Colo., June 18. Issued June 19.

An imperfectly-hardened ♀, which I collected in Johnson's Basin, in Western Socorro county, N. M., June 23, differs in the lighter abdomen, rufous anal segment; the more grayish short bristles of thorax, and darker long bristles of thorax and scutellum; in the oblique white marking of apical cell being united with the distal one of second posterior cell; and by the large inverted V-shaped marking of second posterior cell being represented by an oblique elongate marking parallel to the preceding, and a short marking inside it, both bordering on the hind margin of wing. It will need more material to establish the distinctness of this specimen.

Puparium of *E. bigeloviæ*, containing pupa: Length, 4 mm.; greatest width, 2¼ to 2 2-5 mm. Stouter posteriorly, rufous on posterior portion and brownish anteriorly, eyes and wings of pupa showing beneath puparium as black spots. Puparium showing twelve segments, counting anal and capital plates. Mouth parts of larva showing in centre of capital plate at anterior end of puparium as a very small, central, raised circle, with usually eight primary radiating ridges, their length less than twice the diameter of the circle, these ridges longitudinally and often deeply fluted, giving appearance of smaller, more numerous ridges; a pair of circles exactly similar to the central circle placed on outer margin of the area of radiating ridges, a little dorsally of the central one, and with it forming the three corners of a triangle; from the central circle there extends ventrally a linear, elongate, forked black body seen beneath the integument of the puparium. Anal stigmata showing in centre of anaplate as a pair of small blackish spots, each bearing three principal black tubercles arranged in a slightly crescentic form with the convexity ventral, and a smaller black tubercle in concavity of each crescent, one or more other still smaller ones sometimes apparent; a small, depressed median

Digitized by Google

orifice slightly dorsal to the pair of stigmata, and a third less distinct median stigma considerably removed ventrally from the pair.

Described from two alcoholic puparia taken from galls collected near Apache Spring, June 22, and containing pupæ.

The hymenopterous larvæ and pupæ which I found in the galls, June 22, and which are undoubtedly those of a parasite of the trypetid, consisted of two small larvæ, and a ♂ and ♀ pupa, the latter at once distinguished by the long ovipositor curved forward over her back. This parasite seems nearly to equal its host in size.

The larvæ, in their partially curled position, measure 2½ to 3 mm. long, and fully 2 mm. wide; tapered suddenly toward head and quite so toward anal extremity; whitish, very pale dilute yellowish after immersion for some months in alcohol, mouth parts blackish.

♀ pupa, 4 mm. long, 1½ mm. wide; ovipositor curled forward over back, reaching tip of scutellum; after immersion in alcohol pale fulvous, abdomen at base and eyes blackish. Ovipositor, in its curled position, measures nearly 3 mm.

♂ pupa, 3 mm. long, scarcely 1 mm. wide; pale fulvous, eyes black.

It should also be mentioned that there was bred from the galls collected near Gallo Springs, June 21, a very small weevil less than 3 mm. in length, perhaps an inquiline in the galls. The galls were left attached to very short pieces of the stems, but it is not likely that the weevil came from the stems, which are very small. Moreover a careful examination of the stems with a lens shows no exit hole whatever in them.

NOTE.—Since writing the above, I have found that Mr. Theo. D. A. Cockerell records, on page 106 of West American Scientist, vol. 6 (Sept., 1889), the breeding of a cecidomyiid "from woolly trypetid galls on *Bigelovia*." Mr. Cockerell has also sent me a small gall of this species, with the following note: "Gall of *Trypeta bigeloviæ*, Ckll., Ent. Mo. Mag, 1890, West Cliff, Col." I have not seen Mr. Cockerell's mention of this species in the Ent. Mo. Mag, and do not know whether he described the fly or only the gall. At all events the discovery of the trypetid nature of the gall belongs to him. When I named the trypetid as above, I did not know that the same name had been proposed for the same insect by Mr. Cockerell.

Digitized by Google

THE MEMBRACIDÆ OF ST. VINCENT ISLAND, W. I.

BY F. W. GODING, M. D., PH. D, RUTLAND, ILL.

The material forming the basis of this paper was sent to me last October by Prof. C. V. Riley for determination. The species were collected by H. H. Smith in St. Vincent, West Indies, and are among the most interesting forms of this remarkable family.

Subfamily CENTROTINÆ, Stal.

1. *Monobelus fasciatus*, Fabr.

♂. One example in National Museum.

Subfamily SMILIINÆ, Stal.

2. *Acutalis trifurcata*, n. sp.

♀. Head greenish-yellow, with an oval spot in the middle (in which are the ocelli), and a curved black line around the apex; prothorax shining greenish-yellow, a broad line ending just before the apex, at its middle sending toward the front a line, on each side, which does not reach a line through lateral angles, these lines together resembling a three-tined fork; median line behind this fork much broader; at base of median line a broad line branches from each side backward and outward in the form of an arrow-head; base of prothorax very narrowly shining black; tegmina very pale yellow, veins indistinct; chest, femora, tibiæ and tarsi dark brown. Length, 3 mm.; width, 1½ mm.

Described from one female; type in National Museum.

This species is near *Illinoiensis*, Godg.

3. *Acutalis apicalis*, n. sp.

♂. Shining black, with a submarginal yellow line on each side, originating at the apex of head it extends posteriorly nearly to apex of prothorax, where it converges towards the line on the opposite side, but they do not come together; apex bright yellow; lateral angles of prothorax produced in small tubercles; tegmina light yellow, veins darker Legs light brown, tarsi annulate with brown.

Length, 3 mm.; width, 1½ mm.

Described from one male; type in National Museum.

This species is near *flaviventris*, Leth. It may prove to be the ♂ of *trifurcata*, Godg.

Subfamily MEMBRACINÆ, Stal.

4. *Sphongophorus (Lobocladisca) vexillifera*, n. sp.

Sex (?) Dark brown fuscous; very densely and coarsely punctured. Head vertical, nearly quadrangular, a little longer than the width between

Digitized by Google

eyes; eyes small, brown; ocelli on a line with superior edge of eyes, to which they approach nearer than to each other. Prothorax in front convex, armed with a long, slender, nearly upright compressed horn, leaning slightly forward, seen from side, slightly sinuous and armed near middle of posterior edge with a small tooth; seen from front, thinly compressed, and at apex bidentate, the small teeth divaricate; behind anterior horn near middle of posterior process is a medium sized, compressed, rounded lobe, which, when seen from side, resembles the helmet of a huzzar, the top of which has a sharp, slender, needle-like spine pointing upward; behind the base of this lobe the posterior process extends backward in a low, small, triangular process, placed vertically, with a slender spine extending posteriorly from the base. Lateral angles very prominent; front margin arched to receive the head, the sides of prothorax extending downward in ear-shaped lobules behind the eyes. Elytra ferruginous, with a large black spot across the middle. All the tibiæ very widely dilated and thin.

Length, 6 mm; to tip of tegmina, 7 mm.; breadth, 3½ mm.; altitude, 6 mm.

Described from one example, the sex of which could not be determined without mutilating it. Type in National Museum.

This is nearest to *rigidus*, Stal. It belongs to Stal's subgenus LOBOCLADISCA, which with its related subgenera are characterized as follows:—

Posterior prothoracic process unarmed at the middle.....Subg. SPHONGOPHORUS, Fairm.

Posterior prothoracic process armed at or near middle with a process.

Anterior horn undate, lengthily curved backward, posterior or inferior edge unarmed..... ..... CLADONOTA, Stal.

Anterior horn substraight, not curving behind lobe of posterior process, posterior or inferior edge armed with a tooth or lobe .... LOBOCLADISCA, Stal.

5. Sphongophorus (Cladonota) albofasciata, n. sp.

♂. Blackish-brown, coarsely and roughly punctured, tuberculate. Head longer than wide, inferior edge 3-lobed; ocelli on a line with superior edge of eyes, red, nearer to eyes than to each other, and near base of prothorax. Prothorax highly convex, armed anteriorly with a horn which at first extends upwards, strong and stout; from posterior superior angle it extends, slender and thread-like, posteriorly upward and backward for another third, then it suddenly enlarges in a nearly quadrangular, com-

Digitized by Google

pressed, foliaceous lobe, having a tooth extending posteriorly; this lobe is compressed in centre with a diamond-shaped outline at the posterior edge; about the middle of the posterior process is a cylindrical upright horn, constricted on sides at middle, the upper part produced anteriorly and receives the foliole of the anterior horn which rests upon it; behind this horn the posterior process is slightly enlarged towards apex, where it is truncated diagonally downward and backward. Elytra light brown ferruginous, with a white band extending across the middle. Tibiæ all all widely dilated.

Length, 5 mm.; altitude, 3½ mm.

Described from one male. Type in National Museum.

6. Bolbonota (Tubercunota) bispinifera, n. sp.

♂. Black, covered with auriferous pubescence finely tuberculated. Head longer than wide, sides of face dilated; ocelli on a line with eyes and near base of prothorax, nearer eyes than each other. Prothorax highly convex anteriorly, behind elevated portion strongly declivous; at upper edge of declivity is a short, cylindrical spine pointing upward and backward, and between this and apex of posterior process is a larger transverse spine pointing directly upward; lateral angles produced in tubercles, above which are two little elevated lines on each side, the superior one reaching middle of inferior border of prothorax, diverging posteriorly, the surface between these and median carina smooth. Tegmina with basal portion black, remainder hyaline, veins black. Anterior pair of legs dilated, middle and posterior pairs triquetrous, with strong spines, dark brown.

Length, 1½ mm.; breadth, 1 mm.

Described from one male. Type in National Museum.

It is near *bituberculata*, Stal., and *inæqualis*, Fabr., and belongs to the subgenus TUBERCUNOTA, Godg., which with its relative may be distinguished by the following table :—

Posterior process of prothorax behind middle furnished with a high transverse tubercle or spine, more or less compressed antero-posteriorly; anterior part strongly and gradually elevated up to middle.....Subgenus TUBERCUNOTA, Godg.

Posterior process from apex, seen from side, depressed, in front of depressed part dorsum straight or lightly uni- or bi-sinuate .....Subgenus BOLBONOTA, A. & S.
(Types *melaena*, Germ., *aureo-sericea*, Stal.)

Digitized by Google

The type of the subgenus TUBERCUNOTA, Godg., is *bispinifera*, Godg., which is the smallest known member of the genus.

7. *Enchophyllum (Tropidocera) Rileyi*, n. sp.

♂ and ♀. Head black; prothorax beautiful orange-red, the anterior norn and a stripe passing downward from it, on each side, forks, one branch in front and one behind lateral angles, the front branch extending to eye, the hind one spreading out for a little distance along inferior border, in some examples, all the way to apex, black. Tegmina opaque brown-black, veins distinct. Legs black, front and middle tibiæ dilated, posterior tibiæ triquetrous and spined.

Length to tip of tegmina, 6 mm., including anterior horn, 10 mm.; altitude, 3 mm.

It belongs to Stal's subgenus TROPIDOCERA near *quinque-maculatum*, Fm. I take pleasure in dedicating this, the most beautiful member of the genus, to my esteemed friend, Dr. C. V. Riley, who kindly presented me with the types and who has aided in many ways my studies of this difficult group.

Types in collection of F. W. G., and National Museum.

Described from five examples.

A STATEMENT IN CORRECTION.

BY AUG. R. GROTE, A. M.

In that most useful paper, the "Directions for Collecting and Preserving Insects," by Dr. C. V. Riley, Washington, 1892, occurs the statement, on page 137, that the periodical, the North American Entomologist, was "published by the Buffalo Society of Natural Sciences." The fact is that the little monthly, which only reached its first volume, was edited by myself, and printed and published by Reinecke & Zesch, a Buffalo printing house. The material was written or collected together by myself, and the few plates, mostly contributed by the authors, were gotten up at my sole trouble, and even expense. I corrected the proofs and had sole charge of the periodical, which was intended to include short articles and reviews of current literature upon its subject. The subscriptions, advertisements and what profit resulted upon the undertaking went entirely into the pockets of the printers, who, on my suggestion, undertook the outlay for printing and paper. I received no consideration whatever for my work. The Buffalo Society had nothing, in any shape or manner, to do with the matter. My name is upon the title page and not that of the Society, nor can I find that the Society's name has been ever previously brought forward in connection with my little venture. I am entirely at a loss to account for Dr. Riley's statement, which misrepresents my entomological labours in this particular.

Mailed February 4th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, MARCH, 1893. No. 3.

CANADIAN HYMENOPTERA.—No. 3.

BY W. HAGUE HARRINGTON, OTTAWA.

In my last paper (see page 32) I unfortunately repeated the error made by Provancher in giving Vancouver as the habitat of *Ecthrus Provancheri*. I overlooked its correction (CAN. ENT., Vol. XVII, page 160) by Mr. Brodie, who obtained the insect from Muskoka.

Having recently restudied and rearranged my Ottawa collections of Phyllophaga and Xylophaga, so as to prepare for publication in the *Ottawa Naturalist* a complete list of the local species, I have made some notes which may be of more general interest. There are also several species, apparently new, which I prefer to describe here, as I think that all new species should be described (or at least redescribed) in some publication devoted entirely to Entomology, and accessible to all students. The publication of species in miscellaneous proceedings and transactions prevents many entomologists from having access to them, necessitates an outlay of money and time which in many cases cannot be spared by students, and gives rise to much unnecessary synonymy, etc.

One point of interest in the Tenthredinidæ is the excess of the females, both as regards species and individuals. Of the 152 species which have been taken in this neighborhood the females of 139 species are represented, and the males of 82 only. Both sexes are recognized in 69 species, leaving 70 represented by the female only, and 13 by the male only. This disparity of the sexes is more marked in some sections of the subfamily, notably in the unwieldy and difficult genus Nematus, where of 34 species there occur females of 32, and males of only 10., *i. e.*, only the male of every third species has been found.

The scarcity of males among sawflies is even more marked, when the occurrence of individuals is considered; for in 1,262 specimens there are 885 females and 377 males. Of many species the females and males differ so much in coloration that they have been described as distinct insects, and the relationship of some have undoubtedly not yet been recognized, but there are other species of which, while the sexes are

Digitized by Google

known and readily distinguished, it is very difficult to obtain the males either by collecting in the field or by breeding. Of such may be instanced *Nematus Erichsonii*, Hart. (= *N. cinctus*, Newm, according to Kirby), of which I have only obtained one male, although the females can be taken in any desired number.

Acordulecera saginata, Prov., is apparently the male of *A. dorsalis*, Say., a species which is found upon oak and hickory, the larvæ skeletonizing the leaves.

NEMATUS RUFOCINCTUS, n. sp. Female—Length, 8 mm. Black, with pale legs and rufous band on abdomen. Head rather small; the ocelli in shallow basins defined anteriorly by a distinct sinuate ridge above the antennæ; edge of clypeus, labrum and palpi whitish; antennæ slender, with subequal joints. Thorax polished; tegulæ, angles of prothorax and legs in great part, white; the anterior and median femora touched with brown; posterior legs with apical two-thirds of femora, apical half of tibiæ and the tarsi, black; wings large, hyaline; nervures and stigma black; third submarginal cell quadrate, small, hardly larger than first; the recurrent nervures received about one-fourth respectively from the base and tip of the second submarginal cell. Abdomen robust, with dorsal ridge; basal plates, sides of first segment, spots on fifth, and the terminal segments black, remainder rufous.

One female taken near Hull on 26th June, 1887, upon alder, and in general appearance resembling a small *N. Erichsonii*, Hart.

NEMATUS THORACICUS, n. sp. Female—Length, 6 mm. Head, metathorax and base of abdomen black, remainder rufo-testaceous. Head as wide as thorax, ridges surrounding ocelli ill-defined, but prominent between antennæ; palpi and mandibles pale, the latter with red tips; antennæ long and slender, joints subequal. Thorax rufous, except sutures below wings and the scutellar region, including the scutellum, black; legs rufous, the posterior with tips of tibiæ and the tarsi almost black; wings hyaline, nervures and stigma brownish, third submarginal cell one and one-half times as long as wide; recurrent nervures received respectively about one-fifth from base and one-sixth from apex of second submarginal cell. Abdomen short and stout, slightly ridged dorsally; basal plates and spot on first and second segments black, remainder rufous.

One female taken near the city on May 11th. This species is near *N. bivittatus*, Nort., but the head is much less rugose, and the mesothorax is not lineate with black, etc.

Digitized by Google

NEMATUS LINEATUS, n sp. Female—Length, 7 mm. Rufo-testaceous. Head nearly white below the antennæ, and honey-yellow above, palpi dusky; antennæ as long as head and thorax, rather stout, black; a black spot between ocelli. Thorax orange-yellow; tegulæ and angles of prothorax white; a line on median lobe of mesothorax, a spot above insertion of posterior wings, the apex of scutellum and adjoining sutures, black; legs yellow, coxæ and trochanters paler, tips of posterior tibiæ and tarsi dusky; wings hyaline, nervures brownish, stigma pale, third submarginal cell nearly twice as long as first, recurrent nervures received about one-fourth the distance from base and tip of second submarginal cell. Abdomen broad, compressed toward apex, paler than thorax, basal plates and narrow broken dorsal line black, ovipositor prominent.

One female collected near city on May 5th.

Fenusa varipes, St. Farg. (*melanopoda*, Cam.), previously recorded by Mr. Fletcher as introduced from Europe, was observed on Aug. 26th, upon native alders in a swamp not far from the Experimental Farm, and a number of the leaves showed the characteristic blotches caused by the larvæ. The species can, therefore, be considered as naturalized.

Emphytus multicolor, Nort., (= *Strongylogaster multicolor*, Nort., = *Emphytus hullensis*, Prov.) This is one of the species in which variability in wing-venation has led to a redescription. I have the types, ♀ ♂, of *E. hullensis*, and they agree exactly with the description of *S. multicolor*. Of six specimens which I have since collected, four have four submarginals, as in *S. multicolor*, one three submarginals, as in *E. hullensis*, and the remaining one has three cells in one wing and four in the other. As the insect seems to more nearly resemble an Emphytus than a Strongylogaster or Taxonus, I have referred it to the former genus.

Harpiphorus tarsatus, Say. From a series of specimens taken upon Cornus it seems evident that *H. varianus*, Nort., and *H. versicolor*, Nort., are only varieties of this species. My specimens vary much in colour, but even the blackest show more or less trace of rufous. The insect is very active and difficult to net, as it darts to and fro among the bushes. On one occasion I heard a rustling of insect wings on a branch near the ground and found it to be caused by two males in pursuit of a female, and I netted the three at one stroke.

Monostegia maculata, Nort. I have already (Insect Life, Vol. II., p. 227) discussed the variation in the wing-venation of our common Strawberry Sawfly, and a further examination of the species seems to indicate

Digitized by Google

that it should be placed in the genus Monostegia. It is certainly very unlike the other species of Harpiphorus. Under the name *M. ignota*, Nort., I propose to retain a few immaculate specimens which also slightly differ in other respects.

MACROPHYA ALBILABRIS, n. sp. Male—Length, 8 mm. Black; anterior legs and base of posterior pale. Head rugosely punctured, almost opaque, no depressions or sutures above antennæ; clypeus deeply emarginate, labrum truncate; both, with spot on mandibles, white; antennæ stout. Thorax coarsely punctured, the scutellum rugose; edge of tegulæ and fine line on border of prothorax white; anterior and median legs pale, including portion of coxæ, the femora and tibiæ with dusky abbreviated lines above; tips of posterior coxæ, the trochanters, basal third of femora with line below to apex, white; remainder of femora, the tibiæ and tarsi, black. Edges of basal plates white dorsally.

One male taken near the city, but not dated. This insect is closely allied to *M. flavicoxæ*, Nort., and may prove but a variety of that species, though none of my examples of *flavicoxæ* show any variation of this kind. The chief differences are in the colour of the posterior legs, the white touches on basal plates, and the more deeply emarginate clypeus.

Pachyprotasis omega, Nort.—The insect described by Provancher (CAN. ENT., Vol. XVII., p. 50.) as *Synairema americana*, seems, from his description, to be identical with this species, except that he gives the length as .46 inch, whereas my largest specimen of *omega* is only about .35 inch. Norton in his description of the species gives the length as .26 inch.

Pachyprotasis delta, Prov. Since my notes on this species (CAN. ENT., Vol. XVIII., p. 32) I sent to Mr. Kirby a small lot of Tenthredinidæ regarding which he writes: "The principal remark I have to make on this lot of insects is, that the insect sent as *Tenthredo* (?) *delta*, Prov., is a true Pachyprotasis, near *P. discolor*, Klug., an European species."

Pachyprotasis varipicta, Har. On June 7th, I captured two males which evidently belong to the species which I described as a Harpiphorus (CAN. ENT., Vol. XXI., p. 96), and these show that the species belongs to *Pachyprotasis*, and has, like *P. delta*, very unstable wing venation. One specimen has, like the female described, two cross nervures in the lanceolate cell of one wing. The other has in the right anterior wing *five* submarginals, the third cell being subdivided almost in continuation of the second recurrent. These males differ from the female only in having the

Digitized by Google

apical two-thirds of posterior femora blackish, and the basal segment of abdomen darker at the base. The outer cells of the posterior wings are closed, as in *P. delta.*

Strongylogaster soriculatus, Prov. *S. soriculatipes*, Prov., appears to have been the name under which this species was first published, but the Abbé has used *soriculatus* in republishing, and the old name does not appear in his index.

Tenthredo grandis, Nort. This species is somewhat variable in the extent of its white markings, and I have one specimen which answers exactly to the *T. nigricollis*, Kirby, described from Newfoundland.

Tenthredo basillaris, Prov. This species is placed in Cresson's catalogue as a synonym of *T. signata*, Nort. My specimens, five females, of which one was determined by Provancher, are remarkably uniform in their markings, and do not agree with the description of *T. signata*, so that I am disposed to retain the species as distinct.

Tenthredopsis Evansii, Har. I have a female of this species from the Rocky Mts. near Calgary, and have examined another from Colorado (Gillette.) This insect is very near, perhaps identical with, *Tenthredo viridescens*, Fourcr. (*scalaris*, Klug.) an European species.

TENTHREDOPSIS (?) ANNULICORNIS, n. sp. Female—Length, 10 mm. Head black, rugosely punctured; mandibles, clypeus and triangular spot above rufous, the clypeus strongly notched; antennæ slender, two basal joints and base of third rufous, apex of third, the fourth and terminal three black, joints five and six pure white. Thorax with the pleura coarsely punctured; rufous above with spot on each lateral lobe of mesothorax and the scutellar sutures black; legs rufous, tips of coxæ, the trochanters and posterior tarsi white, tip of posterior femora and of tibiæ black; wings hyaline, nervures blackish, base of stigma white; lanceolate cell with straight, short, cross nervures, as in Tenthredo, etc.; posterior wings without middle cells. Abdomen rufous.

Male.—Length, 9 mm. Antennæ a little stouter, testaceous, rufous toward base. Abdomen with apex blackish.

The female was taken near the city on June 6th, 1891, and the male on May 28th last. The antennæ of the male differ in colour, and in being slightly stouter, from those of the female, but in all other respects it seems to be identical. The strongly notched clypeus, and the absence of middle cells in the posterior wings, would seem to refer the female to Perineura, but the outer cells of posterior wings of the male are not

Digitized by Google

closed. These insects, except for the antennæ, look very much like small specimens of *Harpiphorus varianus*.

PAMPHILIUS RUFICEPS, n. sp. Female—Length, 15 mm. Black, with rufo-testaceous head and legs. Head very large; coarsely punctured, rufous, with a small black spot enclosing the ocelli; mandibles very large; antennæ slender, about 35-jointed, black, with three basal joints rufous, third joint more than twice as long as the fourth. Thorax coarsely punctured, the pleura quite rugosely; tegulæ, anterior angles, lateral lobes and apex of median lobe of mesothorax and scutellum, rufous; beneath black, with dull rufous spots on pleura; legs rufous, coxæ paler, tarsi dusky, the posterior almost black, anterior tibiæ with side spur. Abdomen broad, with narrow lateral margin of bright lemon-yellow.

One female, found walking on a doorstep in the city, May 31st, 1891. This species is near *P. (Lyda) brunniceps*, Cress.

PAMPHILIUS CINCTUS, n. sp. Female—Length, 11 mm. Black, with red band on abdomen. Head polished behind the ocelli, rugulose anteriorly; face flat with a ridge between antennæ, not reaching anterior margin of clypeus; clypeus broad, squarely truncate, not margined, and coarsely punctured; cheeks below the eyes, mandibles, clypeus, triangular spot at inner summit of each eye, similar spots behind on margin of occiput, and two minute dots below ocelli, white; antennæ black, long, slender, 25-jointed, third joint hardly longer than fourth. Thorax polished; tegulæ, short lines in front and beneath, a double triangular spot on middle lobe of mesothorax, scutellum and postscutellum, white; legs pale yellow, including tips of coxæ, anterior tibiæ without side spur; wings hyaline with brown nervures, third submarginal cell large. Abdomen with first segment, except a black spot on each side, and three following, rufous; apical segments black.

One female, taken near the city on June 28th. It resembles in appearance *P. rufofasciata*, Nort., but differs in shape of antennæ and clypeus and in markings.

Pamphilius fascipennis, Cress. This fine species, originally described from the White Mts., N.H., has been taken by Mr. Evans at Sudbury.

Xyela minor, Nort. In June, 1886, I captured by sweeping on the margins of a wood composed of pines, spruces, etc., a male and a female of this very interesting species, which Mr. Kirby thinks should constitute a distinct genus from the European species of Xyela. I failed to obtain the insect again until May 11th, 1891, when, in beating spruce trees, I

Digitized by Google

secured eight females. I endeavored to ascertain if the insects were ovipositing in the twigs, but they are so small and inconspicuous that it was impossible to find them without beating them from the trees. Subsequent beatings in the same locality, and careful search again last May failed to turn up any more. It seems probable, however, that the insect breeds in the young shoots of the spruce (as none could be found on adjoining trees or shrubs of other species), and some of our collectors, knowing when and where to search, may succeed in discovering if such be the case. It may also live in other conifers, as Provancher records taking the female on the buds of white pine, on which I have also taken one specimen.

Xiphydria canadensis, Prov.? In an article on *X. albicornis* ("A new foe to the maple." Rep. Ent. Soc., Ont., 1883, p. 40), I stated that some of the males had the antennæ black, as in *X. Provancheri*, Cress., and that this species and *X. canadensis* were probably only varieties of *X. albicornis*, with which may be also included probably *X. maculata*, Say. In re-studying my specimens I find a female which seems to be distinct, but which, however, does not agree with descriptions of any of the species quoted above as regards markings, although it agrees with *X. canadensis* in having the "head rugose except upon the vertex," and not wishing to create an unnecessary new name I have placed it under that. It has the following characteristics which are not given in the other descriptions:—Antennæ black, 16-jointed only, the second joint much shorter than in *albicornis*, not more than half as long as the third; no white markings above the antennæ on the front, but an almost square patch below and a small spot on each side of clypeus, adjoining a larger spot under the eye. There is also a small spot on the posterior margin of the head behind each eye, and two short lines above ocelli which are differently situated from those of *albicornis*. In that species the lines start about on a level with ocelli and stop before attaining the occipital margin, while in the specimen under consideration they start from the occipital margin and stop at some distance above ocelli. The coxæ are also uniformly rufous instead of black, or blackish, and the markings of thorax are different. The usual white spots occur on segments one to seven of abdomen, with the exception of the sixth.

Xiphydria rufiventris, Cress. This addition to the Canadian fauna has been made by Mr. Fletcher, who has a fine female example taken last year.

Digitized by Google

Tremex columba, Linn. In July, 1891, Mr. John Stewart, of this city, informed me that he had a stick of firewood containing a great many larvæ of beetles. Some days later I called on him to examine it and found that the insects had commenced to emerge, and that they were the common Horntail. The log was gnarlly rock-maple, about 10 inches in diameter, partly decayed, but still very hard, as was proved in sawing out a section, which I took home. I secured a number of larvæ and pupæ, and from the section retained numerous flies emerged, of which only one was a male. On leaving for Japan (July 22nd) I locked the block up in an old cabinet, and on my return found that several more females had appeared, and of course died during my absence. The fact of most interest concerning these is that one had endeavored to deposit in the block, and had died with the ovipositor deeply inserted.

NEW CHERNETIDÆ FROM THE UNITED STATES.

BY NATHAN BANKS, SEA CLIFF, N. Y.

Since my last article on this group (CAN. ENT., Aug., 1891), I have obtained quite a number of forms; some of the new ones are described in this article. Two genera, new to the U. S., are recorded, both of which occur in South America. *Chelifer alius*, described by Leidy in Proc. Phil. Acad. Sci., 1877, agrees, as far as description goes, with *Chelanops oblongus*, Say, and with no other form known to me, therefore I consider it a synonym of *C. oblongus*.

CHELANOPS PALLIPES, n. sp.

Length, 3 mm. Colour: cephalothorax, dark brown; palpi, red-brown; dorsal scutæ, yellow-brown; legs, yellow-brown. General appearance of *C. acuminatus*, but the hand is not black as in that species. Structure also similar to *C. acuminatus*, differs in being furnished with clavate hairs; the trochanter does not project as much behind; the femur is more slender; the tibia is not nearly as much gibbose on the inner side; the hand less broad and shorter; the fingers much more slender, about as long as the hand.

California. A few specimens.

CHELANOPS LATUS, n. sp.

Length, 3.2 mm. Cephalothorax and palpi red-brown, the fingers black, scutæ red-brown, legs brownish-yellow. Structure similar to *C.*

Digitized by Google

acuminatus; hairs simple, the trochanter is less gibbose behind, the femur a little more slender; the tibia enlarges quite suddenly on the internal margin, but is then more parallel with the external margin than in either *C. acuminatus* or *C. pallipes;* the hand is more slender than in *C. acuminatus*, and the sides are quite nearly parallel; the fingers stout and much shorter than the hand.

East Florida. Under bark of pine trees. Common.

CHELANOPS GROSSUS, n. sp.

Length, ♀, 4.7 mm.; ♂, 3.3 mm. Similar to *C. oblongus*, Say, but very much larger. Palpi uniform dark red-brown; anterior part of cephalothorax similar but paler, beyond the suture yellowish; dorsal scutæ, yellow-brown; legs, pale. Body very long and narrow; cephalothorax shining, smooth; palpi with long simple hairs. Palpi similar to *C. oblongus;* hand longer and the sides more parallel; the tibia not so much swollen on the inner side and thus more slender.

Colorado. [Dr. C. F. Baker.] Apparently common.

OLPIUM OBSCURUM, n. sp.

Length, 2 mm. Colour in life blackish, in alcohol the cephalothorax and abdomen greenish with sides blackish, legs pale with a greenish tinge, palpi brownish-yellow with a tinge of green, hands darkest. Cephalothorax narrower in front than behind, anterior eyes about their diameter from anterior margin, posterior eyes just behind anterior ones and looking more dorsal; stylet simple; abdomen widest at about seventh segment, quite long; palpi shorter than abdomen; trochanters somewhat conical, sides convex; femur not quite as long as cephalothorax is broad at posterior margin, barely pedicellate; sides almost parallel, internal margin a little convex near base, then a little concave, external margin almost straight; tibia short, pedicellate, a little shorter than femur and broader than that joint, both sides convex; hand about as long as tibia, barely pedicellate, sides but little convex; fingers a little shorter than hand and curved.

East Florida. One specimen, swept from grass.

RONCUS, Koch.

Allied to *Chthonius*, differs in having but one eye on each side of cephalothorax. Not previously known from U. S.

Digitized by Google

RONCUS PACIFICUS, n. sp.

Length, 1.6 mm. Colour, pale whitish; mandibles and claws of palpi reddish; femora of palpi sometimes reddish; dorsal scutæ of abdomen yellowish-brown; legs with a pinkish tinge; young specimens lighter than adult ones. Mandibles large, as in *Chthonius;* cephalothorax somewhat narrower behind than in front, sides slightly curved, one large eye each side near anterior margin; palpi not as long as body; hand with fingers almost as long as cephalothorax plus mandibles; femur about as long as cephalothorax, sides about parallel; tibia almost conical, almost as wide at tip as the hand at base; hand not pedicellate, longer than tibia, sides but little convex: fingers longer than hand, about straight; legs short, hind pairs not much enlarged. Body and appendages with simple hairs.

Washington State. [Kincaid.] A few specimens.

IDEORONCUS, Balzan.

Allied to *Obisium*, but has only one eye each side of cephalothorax and the claw of mandible has a prominent stylet. Species previously known from South America.

IDEORONCUS OBSCURUS, n. sp.

Length, 3.2 mm. Colour, pale whitish; anterior part of cephalothorax with a reddish tinge, mandibles pinkish, palpi red, dorsal scutæ pale yellowish; body soft. The mandibles have a long stylet, which is divided into two parts; the cephalothorax is a little narrower in front than behind; the eyes, hardly perceptible above, are two, one each side, about its diameter from anterior margin; the cephalothorax just in front of eyes is more suddenly narrowed than elsewhere. Palpi shorter than body; trochanters almost twice as long as wide, the internal margin about straight, external margin quite suddenly but not greatly swollen; femur not quite as long as cephalothorax and broader than trochanters, pedicellate, internal margin at first convex then concave, external margin convex, slightly narrower near tip than near base; tibia shorter, pedicellate, external margin evenly convex, internal one convex, more so near base than near tip; hand as long as tibia, short pedicellate, much broader than other joints, neither margin much convex; fingers shorter than hand, slightly curved, stout. Body and appendages with simple hairs. Abdomen long, sides nearly parallel, not much broader than cephalothorax. The outlines of trochanters can be distinctly seen on the femora

Digitized by Google

of all legs. The tarsi are divided into two parts by a transverse suture; posterior pairs of legs but little larger than the anterior pairs.

Washington State. [Kincaid.] Two specimens.

CHTHONIUS SPINOSUS, n. sp.

Length, 1.7 mm. Colour, hard parts pale tinged with reddish-brown, venter of abdomen white; abdomen with a few silvery white spots. Anterior part of cephalothorax a little wider than posterior, the anterior portion bent downward and divided in the middle by a deep furrow, the mandibles bent downward; the cephalothorax, basal joints of mandibles, and segments of abdomen provided with scattered conical tubercles which bear a spine at tip. Cephalothorax and palpi finely granulated, basal joint of palpus [trochanter] short, not visible from above; femur about length of cephalothorax, sides nearly straight, tip a little larger than base, patella short, almost conical; hand once and a-half as long as patella, sides nearly straight but little swollen, the inner side the most so; fingers straight, longer than hand. Eyes a little more than their diameters apart. Abdomen twice as long as cephalothorax. Anterior legs long and slender; posterior pairs larger but hardly longer; trochanters distinct on posterior pairs.

Citrus Co., Florida. [C. M. Weed.] Quite common.

DESCRIPTIONS OF NEW BRACONIDS BRED BY PROF. A. D. HOPKINS.

BY WILLIAM H. ASHMEAD, WASHINGTON, D. C.

In the following pages I describe the new Braconids bred by Prof. A. D. Hopkins, of the West Virginia Agricultural Experiment Station, as recorded by him in Insect Life, Vol. IV., pages 256 to 259.

The types are in the National Museum.

Subfamily BRACONIDÆ.

BRACON, Fabr.

(1) *B. lixi*, sp. n. Bracon lixi, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 3.5 mm.; ovipositor, 1 mm. Brownish-yellow; stemmaticum, metathorax above, first abdominal segment and an oblong median spot on second segment at base, black; sometimes the middle lobe of meso-scutum is black anteriorly; antennæ 35-jointed, brown. Head and thorax smooth, shining, the head transverse. Wings hyaline; tegulæ yellow; costa, stigma and nervures dark brown; recurrent nervure

Digitized by Google

received in the apical angle of the first submarginal cell; second abscissa of radius twice as long as first; second submarginal cell twice as wide at base as at apex. Legs pale brownish-yellow, the apex of posterior tibiæ above and the basal 3 or 4 joints of tarsi more or less dusky. Abdomen oblong-oval, the first segment above and the black median spot on the second, rugulose; rest of the surface granulated or shagreened; the first segment is the longest; the second and third about equal, the suture between being distinct, crenated; the following subequal, the fourth being one-third shorter than the third.

Hab.—Morgantown, W. Va.

Bred from *Lixus scrobicollis*, living in *Ambrosia trifida*.

(2) *B. rufomarginatus*, sp. n.

♀—Length, 2 mm.; ovipositor, 0.5 mm. Polished black; orbits, a line extending from base of eye and along the clypeus, yellow; palpi black; legs black, beneath pale brownish; lateral margins of the abdomen and the venter reddish-yellow; antennæ 24-jointed, black; wings fuliginous; the second abscissa of radius one-half longer than the first; the second submarginal cell not narrowed at apex.

Hab.—Morgantown, W. Va.

Comes nearest to *B. phycidis Riley*, but with darker wings and different coloured legs.

Subfamily EXOTHECINÆ.

RHYSIPOLIS, Forster.

(3) *? R. biformis*, sp. n. Rhysipolis biformis, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 3.5 mm.; ovipositor a little longer than the abdomen. Head and thorax black, pubescent; abdomen ferruginous; anterior coxæ, all trochanters, except slightly on the upper surface, annulus at base of all tibiæ and all tarsi, honey-yellow or pale ferruginous; middle and anterior coxæ and all femora black; mesopleura reddish or piceous. Head quadrate, above smooth, polished, with a delicate occipital margin; face finely punctate with a sparse, rather long, whitish pubescence; mandibles black; palpi piceous. Thorax finely shagreened, the parapsidal furrows obsolete posteriorly but sharply defined anteriorly, the middle lobe just in front of scutellum depressed, rugulose with a slight median keel; meso-pleura smooth and pale or piceous at the middle, with a slight longitudinal sulcus; scutellum smooth, with a crenate furrow across the base; meta-thorax rugose, with a delicate median carina down the centre

Digitized by Google

slightly forked at apex. Wings subfuliginous, the stigma and venation brown; submedian cell longer than the median, the recurrent nervure not interstitial but joining the first submarginal cell at the lower apical angle; first abscissa of radius about half the length of the second. Abdomen ferruginous or reddish-yellow, the first and second segments rugose or shagreened, the following smooth, polished. In one specimen the basal part of the third segment, as well as the first two, is also shagreened.

In the ♂ the apical margins of the third and following abdominal segments are piceous; the antennæ are much longer than the body, brown-black, 36-jointed; the legs similar to the female, but with the femora more piceous, not black; otherwise as in female.

Hab.—Morgantown, W. Va.

Bred Sept. 14, 1891, from a Buprestid, or Longicorn, larva living under bark of dead Spruce *Abies nigra*.

I am doubtful about the position of this insect, as it might just as well be placed in the genus *Doryctes* as in *Rhysipolis*, having a close resemblance to *Doryctes radiatus* Cr., *D. macilentus* Prov., *D. fartus* Prov., and other species in this genus.

Subfamily RHYSSALINÆ.

RHYSSALUS, Haliday.

(4) *R. pityophthori*, sp. n. Rhyssalus pityophthori, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 1.2 mm.; ovipositor shorter than the abdomen. Black, shining; head transverse, smooth, impunctured; mandibles and palpi pale ferruginous; antennæ very little longer than the body, (?) 17-jointed. Thorax alutaceous, the parapsidal furrows distinct, the middle lobe with a median impressed line anteriorly. Wings hyaline, strongly iridescent, the stigma and nervures brown, the first abscissa of radius two-thirds the length of the second, the marginal cell long, extending to tip of wing. Legs, including coxæ, pale or honey-yellow. Abdomen oblong-oval, ferruginous, the ovipositor black.

Hab.—Morgantown, W. Va.

Bred July 29, 1891, from Yellow Pine twigs infested with *Pityophthorus*, sp.

Digitized by Google

Subfamily SPATHIINÆ.

SPATHIUS, Nees.

The following table will aid in determining the species in this genus known to me as occurring in our fauna :—

TABLE OF SPECIES.

Wings fuscous or blackish, with 3 white transverse bands (*i. e.*, one white band with the base and apex of wing white).....3

Wings fuscous, with one white band.....2

Wings hyaline or subhyaline, without bands.

Testaceous; pleura, metathorax and petiole blackish or fuscous.

Petiole very long and slender, two-thirds the length of the thorax; legs entirely pale yellow; antennæ 24-jointed. (♂, length, 2.5 to 3 mm.)..... .....*S. longipetiolatus*, sp. n.

Testaceous; abdomen from apex of second segment black.

Petiole not more than half the length of thorax; legs pale yellow; antennæ 24-jointed. (♂, length, 2.1 mm.)..... .....*S. californicus*, sp. n.

Black; face, collar, mesopectus, legs, petiole and basal half of second abdominal segment, testaceous.

Petiole a little longer than half the length of thorax; hind femora subfuscous. Antennæ 23-jointed. (♂, length, 2 mm.) ....*S. claripennis*, sp. n.

2. Black; head, apex of petiole, base of second segment, fuscous or piceous; all femora much swollen; trochanters, annulus at base of tibiæ and the tarsi, white; ovipositor twice the length of abdomen. Antennæ 34-jointed. (♀, length, 4 to 4.5 mm.)..*S. unifasciatus*, sp. n.

3. Species for the most part testaceous or brownish-yellow.....4

Species black or dark fuscous.

Collar, petiole and base of second segment, pale brownish-yellow; trochanters, base of tibiæ and the tarsi, yellowish-white; sometimes the mesopectus and head more or less rufo-testaceous; basal half of second abdominal segment always finely sculptured or shagreened; ovipositor 1½ to 2 times as long as the abdomen.

♀, antennæ 32 to 35-jointed; ♂, antennæ 25-jointed. (Length, from 2 to 4.5 mm.).....*S. simillimus*, sp n.

Digitized by Google

Ovipositor not longer than the abdomen.

Head polished, with traces of faint transverse striæ before the ocelli but none behind; second abdominal segment faintly granulated at base.

♀, antennæ 29-30; ♂, 26-jointed. (Length, 2 to 2.5 mm.).... .....*S. tomici*, sp. n.

Ovipositor half the length of abdomen.

Head transversely rugulose; second abdominal segment perfectly smooth, polished.

♀, antennæ broken. (Length, 3 mm.).....
.....*S. brachyurus*, sp. n.

4. Rust brown, disk of thorax and scutellum black.

Ovipositor nearly twice the length of the whole insect.

Head polished, although faintly transversely aciculated; abdomen elongate, black, shining, the petiole finely rugose, not longitudinally striated; the second segment with some faint aciculations only at base.

♀, antennæ 20-jointed, reaching only to the base of the metathorax. (Length 3.5 to 4 mm.).....
.....*S. Laflammei*, Prov.

Ovipositor not quite as long as the whole insect.

Head opaque, finely rugose, the rugæ posteriorly transverse; abdomen oblong-oval, the apical one-third of the second segment and following segments black polished; petiole coarsely longitudinally striated; basal half of second segment shagreened.

♀, antennæ multiarticulate (broken at tips). (Length, 5.5 mm.).....*S. floridanus*, sp. n.

Brownish-yellow or testaceous, sometimes varied with fuscous.

Ovipositor shorter than the body, usually shorter than the abdomen.

Head finely rugose and transversely aciculated; second abdominal segment basally feebly shagreened; ovipositor longer than the abdomen. (Length, 4.5 to 5 mm.).....*S. trifasciatus*, Riley.

Ovipositor shorter than abdomen.

Head polished without or with very faint transverse aciculations; base of second segment and the petiole yellow,

Digitized by Google

rest of abdomen black, the basal half of the second segment very finely shagreened. Antennæ 23-jointed, a little longer than the body. (♀, length, 2.8 mm.).. .....*S. Canadensis*, Ashm.

Head shining, transversely striated; basal two-thirds of second segment finely shagreened, the rest of abdomen smooth, polished. Antennæ 30-jointed, longer than the body. (♀, length, 3.5 mm.).....*S. pallidus*, sp. n.

Head opaque, minutely transversely rugulose; the second segment has the basal one-third finely shagreened, then followed by a smooth polished space and again shagreened, and polished again at apex. Antennæ longer than the body, more than 33-jointed (the tips broken off). (♀, length, 4 mm.)..... ..*S. brunneus*, Ashm.

Head smooth polished, with scarcely a trace of any transverse aciculations; second segment polished, impunctured. Antennæ 25-jointed. (♀, length, 3 mm.)..... .....*S. sequoiæ*, Ashm.

(5) *S. claripennis*, sp. n. Spathius clavipennis, Ashm, MS. (err. impr.), Ins. Life, IV., p. 257.

♂.—Length, 2 mm. Black; prothorax, mesopectus, petiole and basal half of second abdominal segment, testaceous or yellow; legs pale, the posterior femora and their tibiæ toward apex slightly dusky. Wings hyaline, the stigma and nervures brown. Antennæ 23-jointed, fuscous, the basal three or four joints pale yellowish. The head is polished, with some faint transverse aciculations on the vertex. Thorax subopaque, finely granulated or shagreened; the petiole longitudinally striate.

Hab.—Morgantown, W. Va.

Bred April 20, 1892, from *Polygraphus rufipennis* living under the bark of dead *Abies nigra*.

(6) *S. unifasciatus*, sp. n. Spathius unifasciatus, Ashm., MS., Ins. Life, IV., p. 258.

♀.—Length, 4 to 4.5 mm. Black; collar anteriorly dull ferruginous; apex of petiole and base of second segment reddish piceous; legs fuscous, anterior and middle coxæ and trochanters, posterior trochanters and annulus at base of all tibiæ, white; tarsi more or less pallid beneath. Antennæ 34-jointed, fuscous, the basal 3 or 4 joints pallid. The head is polished, the vertex faintly transversely aciculated, the frons and

Digitized by Google

face rougher; thorax closely granulated, opaque, the middle lobe posteriorly, pleura and metathorax, finely rugulose, the latter indistinctly areolated. Wings fuliginous, with a white band across the middle from the base of the stigma, the apex of the wing showing scarcely any white. All the femora are very much swollen, while the abdomen, except the petiole, is smooth, polished; petiole longitudinally striate, somewhat rugose basally.

Hab.—Morgantown, W. Va.

Bred April 29, 1892, from *Scolytus 4-spinosus* living under the bark of *Carya alba.*

(7) *S. simillimus*, sp. n.

♂, ♀.—Length, 2 to 4.5 mm. Black; collar, mesopectus and petiole pale ferruginous or brownish-yellow. Head above transversely aciculated; thorax opaque, closely granulated; the middle mesothoracic lobe posteriorly and the metathorax finely rugose, the latter faintly areolated; petiole striate. Wings fuscous, white at base and tips, and with a transverse white band from the base of stigma. Antennæ in ♀ 32 to 35-jointed, in ♂ 25-jointed, fuscous, pale toward base. Legs fuscous; the coxæ and trochanters, annulus at base of tibiæ and the tarsi, white. Abdomen, except petiole and base of second segment, black, the basal half of the second segment shagreened; ovipositor as long or very little shorter than the body.

Hab.—Morgantown, W. Va.

Bred May 18 and 25, 1892, from *Agrilus bilineatus* living in White Oak stump.

(8) *S. brachyurus*, sp. n. Spathius brevicaudus, Ashm., MS. (Olim. preoc.), Ins. Life, IV., p. 258.

♀.—Length, 3 mm.; ovipositor half the length of abdomen. Much like *S. simillimus*, but with the lower part of head, the prothorax, metathorax and petiole brownish, the ovipositor very much shorter, in *simillimus* being about as long as the whole insect, while in *brachyurus* it is only half the length of the abdomen. The head is transversely rugulose; the legs and antennæ brown, the tibiæ not annulated with white, the femora not especially thickened; while the second abdominal segment is perfectly smooth and polished.

Hab.—Morgantown, W. Va.

Bred Nov. 10, 1890, and March 15, 1891, from *Dryocoetes autographus* living under bark of dead *Abies excelsa.*

Digitized by Google

(9) *S. pallidus*, sp. n.

♀.—Length, 3.5 mm.; ovipositor a little longer than the abdomen. Pale ferruginous or honey-yellow; coxæ, trochanters, base of tibiæ and tarsi, whitish. Head shining, transversely striated; antennæ 30-jointed, longer than the body; petiole as long as the body of abdomen, striated; second abdominal segment nearly twice the length of the third, the basal two-thirds finely shagreened or coriaceous, the following segments polished, impunctured. Wings fuscous, whitish at base and tips, and with a white band across from base of stigma. The parapsidal furrows are distinct, converging and meeting at base of scutellum, the middle lobe thus formed being smooth and not rugose at base just in front of the scutellum, as in the other species.

Hab.—Morgantown, W. Va.

Bred from *Tomicus cacographus* living in Yellow Pine.

Subfamily HECABOLINÆ.

LYSITERMUS, Förster.

(10) *L. scolyticida*, sp. n. Lysitermus scolyticida, Ashm., MS., Ins. Life, IV., p. 258.

♀.—Length, 2.1 mm. Black, shining, impunctured; mesoscutum with two distinct furrows; metathorax finely rugose; wings hyaline, nervures brown; legs honey-yellow, the posterior tibiæ and tarsi subfuscous. Antennæ 17-jointed, black, the three basal joints yellow. Abdomen oblong-ovate, composed of but three visible segments, the first segment and the second at the extreme base striated, otherwise smooth and polished; ovipositor as long as the abdomen.

Hab.—Morgantown, W. Va.

Bred April 30, 1891, from *Scolytus 4-spinosus* living under Hickory bark.

CÆNOPHANES, Forster.

In describing the species in this genus reared by Prof. Hopkins, I have taken advantage of the opportunity to publish a table of the species known to me in our fauna, believing the characters given in the table sufficient for the recognition of all the species.

TABLE OF SPECIES.

Testaceous or brownish-yellow species.....2

Black or blackish-fuscous species.

Ovipositor longer than the whole insect.

Digitized by Google

Collar and legs yellow; abdomen piceous; first segment and basal two-thirds of second longitudinally striated, the second with a transverse impressed line at the middle.

Metathorax with two areas at base; antennæ in ♀ 24-jointed..... *C. longicaudus*, sp. n.

Metathorax rugose, but without areas at base; antennæ in ♀ 18-jointed.... *C. flavicollis*, sp. n.

Ovipositor not quite as long as the body.

Head piceous, polished; collar, mesosternum, legs and basal half of abdomen, yellow; antennæ 24-jointed; metathorax with two smooth areas at base..... *C. consimilis*, sp. n.

Ovipositor scarcely as long as the abdomen.

Head minutely punctulate, subopaque; legs, base of second abdominal segment and the three terminal segments, yellowish; first segment, basal two-thirds of second and base of third and fourth, striated; the second segment with two transverse impressed lines; antennæ 28-jointed . ..... *C. languriæ*, sp. n.

Head transversely aciculated, shining; legs brown, trochanters and tarsi yellow; abdomen piceous black, the first and second segments striated, the following smooth; antennæ in ♀ 19-, in ♂ 18-jointed..... *C. atrata*, Ashm.

Ovipositor half the length of abdomen.

Head polished, impunctured; legs yellowish-white; abdomen piceous or yellowish at base of second segment, also sometimes at apex of first; first segment, basal two-thirds of second and base of third, striated; rest of abdomen smooth, shining, the second segment with a transverse impressed line at the middle; antennæ in ♀ 23-jointed.. ..... *C. anthaxiæ*, sp. n.

Head transversely aciculated; legs brownish-yellow, the hind coxæ black; abdomen finely rugose, the first segment and the following segments (except apical portion of the 3, 4 and 5, two-thirds of the 6 and the 7, which are polished), striated; second segment with two longitudinal furrows; antennæ 25-jointed..... ..... *C. borealis*, Ashm.

Legs pale brown, trochanters and tarsi whitish; abdomen elongate ovate, black, polished, the first two segments and

Digitized by Google

the third at extreme base striated, the second segment without a transverse furrow; ♂, antennæ 22-jointed..... .....*C. pityophthori*, sp. n.

Ovipositor one-third the length of abdomen.

Head smooth, polished; collar, mesosternum, second abdominal segment and the apex of abdomen, more or less, yellow; first segment, basal two-thirds of second, and base of third and fourth, striated; the second with two transverse impressed lines; antennæ 25-jointed..... ....*C. floridanus*, sp. n.

2. Ovipositor longer than the abdomen.

Head black or piceous black, polished, impunctured; scutellum with two large foveæ at base; metathorax with two large areas at base, posteriorly rugose or reticulated; antennæ in ♀ 31-jointed.....*C. atriceps*, sp. n.

Ovipositor two-thirds the length of abdomen.

Metathorax with two areas at base.

Head transversely aciculated.

First abdominal segment and basal two-thirds of second striated; rest of abdomen smooth, polished, the second segment with a transverse impressed line; antennæ in ♂ and ♀ 25-jointed... .....*C. hylotrupidis*, sp. n.

First abdominal segment, basal two-thirds of second, and the bases of the third and fourth, striated, the second with two transverse impressed lines; antennæ in ♂ 30-, in ♀ 25-jointed..... .....*C. aciculatus*, sp. n.

Ovipositor less than half the length of the abdomen.

Metathorax with a petiolate, diamond (◊) shaped area.

Head transversely aciculated; first abdominal segment, the second, except at apex, and base of third and fourth, striated, the second with a transverse impressed line at basal one-third and a transverse depression a little beyond; antennæ in ♀ 36-jointed..*C. prodoxi*, Riley.

Metathorax rugose, reticulated, with two areas at base.

Head smooth, polished; first abdominal segment,

Digitized by Google

basal two-thirds of second, striated, the second with a transverse furrow at the middle.....
.....*C. melleus*, Riley.

Ovipositor one-third the length of abdomen.

Metathorax rugose, but not areolated; first abdominal segment and basal half of second, striated; rest of abdomen smooth, polished; antennæ in ♀ 18-, in ♂ 19-jointed....
.....*C. Koebelei*, Riley.

Metathorax with a petiolate, diamond-shaped area at the middle and with two areas at base; first, second and base of third abdominal segments striated, the rest smooth, polished; antennæ in ♀ 24-jointed, in ♂ 27 or 28-jointed.....
.....*C. Chittendenii*, sp. n.

(10) *C. languriæ*, sp. n. Caenophanes languriæ, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor scarcely as long as the abdomen. Head and thorax black, the parapsidal furrows, collar and mesopleura ferruginous, with sometimes the face and orbits ferruginous, the second abdominal segment with 2 transverse impressed lines; abdomen in ♂ pale ferruginous, in ♀ darker, with the base of second abdominal segment and the three last segments yellowish. Head minutely punctulate; antennæ in both sexes 28-jointed; wings sub-hyaline, the first and second branches of the radius equal in length; first abdominal segment, basal two-thirds of second, and base of the third, and in the ♂ the sutures at base of 3, 4 and 5, striated.

Hab.—Morgantown, W. Va.

Bred Dec. 24, 1891, and Feb. 24, 1892, from *Languria* larvæ living in pith of *Ambrosia trifida* and *artemisiæfolia*.

(11) *C. anthaxiæ*, sp. n. Caenophanes anthaxiæ, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor half the length of abdomen. Head and thorax in ♂ black, in ♀ fuscous; the head polished, impunctured; thorax closely microscopically punctate, the middle lobe posteriorly rugose; abdomen ferruginous, the first segment, basal two-thirds of the second, and the suture between segments 3 and 4, striate; legs pale yellow; wings hyaline, the first abscissa of radius two-thirds the length of the second. Abdomen sometimes fuscous, with a pale blotch at the middle.

Digitized by Google

Hab.—Morgantown, W. Va.

Bred May 4 and June 24, 1892, from *Anthaxia viridicornis* infesting Willow; and May 26, from an *Agrilus* larva living under the bark of Dogwood, *Cornus florida*.

(12) *C. pityophthori*, sp. n. Caenophanes pityophthori, Ashm. M. S., Ins. Life, IV., p. 258.

♂.—Length, 2 mm. Black; second abdominal segment at base and sometimes the petiole at apex ferruginous; head shining, faintly transversely aciculated on vertex; thorax opaque, minutely granulated; metathorax areolated, the pleura rugose; antennæ 22-jointed, black, the 3 basal joints yellow; abdomen elongate ovate, black, polished, the first two segments and the third at extreme base or the suture striated. Legs pale yellowish. Wings hyaline, the first abscissa of radius less than two-thirds the length of the second.

Hab.—Morgantown, W. Va.

Bred Feb. 24, 1892, from *Pityophthorus* sp. living under the bark of a small dying Spruce, *Abies nigra*.

(13) *C. hylotrupidis*, sp. n. Caenophanes hylotrupidis, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor two-thirds the length of abdomen. Pale ferruginous; metathoracic sutures fuscous. Head above transversely aciculated; thorax finely granulated, the middle lobe posteriorly strongly rugose; metathorax, except the two basal areas, rugose, and with a A-shaped carina at the middle; first abdominal segment and basal two-thirds of the second striate, rest of abdomen smooth, polished, the second segment with a transverse impressed line at the middle. Antennæ in both sexes 25-jointed. Wings hyaline, the stigma and nervures pale brown, the first and second branches of the radius about equal in length.

Hab.—Morgantown, W. Va.

Bred April 4, 1891, from *Hylotrupes ligneus* living in *Juniperus virginiana*.

Subfamily HELCONINÆ.

HELCON, Nees.

(14) *H. occidentalis*, Cr. Helcon tetrapodii, Ashm., MS. (olim), Ins. Life, IV., p. 259.

Bred July 14, 1891, from *Tetrapodium cinnamoplerum* living in sapwood of Spruce log *Abies nigra*.

Digitized by Google

Subfamily ALYSIINÆ.

ADELURA, Förster.

(15) *A. tibialis*, sp. n.

♂.—Length, 1.5 mm. Polished black; lower half of head, two basal joints of antennæ, legs, including coxæ, except the posterior tibiæ which are fuscous, and first and second abdominal segments, honey-yellow. Head transverse, wider than the thorax, the ocelli close together. Palpi white. Antennæ 24-jointed, black, much longer than the body. Thorax smooth, without distinct parapsidal furrows, or only indistinctly impressed anteriorly. Mesopleura piceous; metathorax almost smooth, the surface wrinkled posteriorly. Wings large, hyaline, the tegulæ white, the costa and the elongate stigma black; rest of venation brown; the first branch of the radius very short, the second very long, about twice the length of the first transverse cubital nervure; the second submarginal cell very long, twice as broad at base as at apex; recurrent nervure almost interstitial received in the angle of the second submarginal cell; submedian cell a little longer than the median. Abdomen oblong-oval, smooth, shining, the first segment finely rugose.

Hab.—Morgantown, W. Va.

Subfamily DACNUSENÆ.

COELINIUS, Nees.

(16) *C. Hopkinsii*, sp. n.

♀.—Length, 4 mm. Black, shining; prothorax, legs, including coxæ, and the second abdominal segment, brownish-yellow; mandibles rufous; palpi white. Head oblong, smooth and polished; face punctate with a median carina, pubescent. Antennæ 33-jointed, black, as long as the body; the two basal joints, and the flagellum beneath for more than half its length, brownish-yellow. Thorax smooth, shining, trilobed; mesopleura separated from the mesosternum by a large longitudinal furrow and with a triangular fovea posteriorly; the surface, except anteriorly where it is sparsely punctate, is smooth and shining; metathorax rugose. Wings hyaline, the venation brown-black, the costa towards base and the tegulæ yellowish. Abdomen twice as long as the thorax, compressed beyond the second segment; except the second segment, black, smooth and shining; the first segment is one-third longer than the second, rugulose, smoother at apex.

Hab.—Morgantown, W. Va.

Digitized by Google

SYNOPSIS OF THE ASILID GENUS DIOCTRIA.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table includes all the species of *Dioctria* known to me as occurring in North America:—

1. Wings on the basal half yellow, on the apical half blackish.....2
   Wings not marked like this, nearly uniformly blackish.....3
2. Legs wholly black; length, 4 mm.....*parvulus*, n. sp.
   Legs partly reddish-yellow; length, 7 mm.....*Sackenii*, Will.
3. Abdomen wholly black.....4
   Abdomen and legs partly reddish.....6
4. Legs wholly black.....5
   Legs having base of tibiæ broadly reddish-yellow; mystax black .....*nitida*, Will.
5. Mystax black.....*albius*, Walk.
   Mystax red.....*resplendens*, Lw.
6. Antennal style nearly half as long as the third joint, coxæ red .....*pusio*, O. S.
   Antennal style one-sixth as long as the third joint, coxæ black .....*rubidus*, n. sp.

DIOCTRIA PARVULUS, n. sp. ♂.

Wholly black, shining. Pile of head light yellow, that on sides of face very sparse, extending to base of antennæ. First two joints of antennæ subequal in length, the third joint as long as the first two taken together; style one-sixth as long as the third joint, thick and blunt. Pile of thorax rather abundant, that on abdomen very sparse and short, bright yellow. Base of wings to beginning of fifth posterior cell yellowish-white, beyond this blackish; all posterior and the anal cell open. Length, 4 mm. Los Angeles County, Cal. Two specimens.

DIOCTRIA RUBIDUS, n. sp. ♂.

Head black, the pile light yellow; face with a large fovea above the centre, below which is a large gibbosity bearing the rather dense mystax; face covered with a very short, brassy yellow pubescence, and with a few pile on each side above. Antennæ black, first joint one and a-fourth times as long as the second, the third joint slightly longer than the first two taken together, the style one-sixth as long as the third joint, very robust, its tip blunt. Thorax and scutellum shining black, quite thickly light yellow pilose. Abdomen shining reddish-brown, except the first segment which is black, but sometimes the second segment and a large portion of the third and fourth segments are also black; pile very sparse and short, light yellow. Legs yellowish, the coxæ, trochanters, apical three-fourths of hind tibiæ, and sometimes also of the other tibiæ, and all the tarsi, black. Wings blackish, all posterior and the anal cell open. Halteres yellow. Length, 7 mm. Los Angeles County, Cal. Three specimens.

Digitized by Google

NOTES FROM THE CORNELL INSECTARY.

I.—SOME RESULTS OF A TRAP LANTERN EXPERIMENT.

BY M. V. SLINGERLAND, CORNELL UNIVERSITY, ITHACA, N. Y.

May 1, 1889, the Entomological Department of the Cornell Agricultural Experiment Station set six trap lanterns, at considerable distances apart, on the University farm for the purpose of determining their value as an insecticide. Each trap consisted simply of a common lantern set in a pan of water whose surface had a thin film of kerosene upon it to facilitate the destruction of the insects caught. The lanterns were kept burning every night until Oct. 15, 1889, or until no more insects were attracted. The captured insects were taken from the pans every morning and placed in alcohol, those from each lantern being kept separate. So many outside influences, as other lights, the smallness of the area covered, etc., entered into the case, that practically no results were obtained from the different locations of the lanterns in the number of specimens caught by each lantern in any of the species thus far studied. Therefore, in the tables which follow, the total catch for each day from all the lanterns is placed under that date.

An immense amount of material was taken, representing nearly every order of insects; the moths, however, included a majority of the specimens. But comparatively little of the material has yet been studied. Several species of Cut Worm Moths, the Apple-tree Tent Caterpillar Moth, and all the species of the May Beetles taken in the lanterns have been determined by the writer. As all of these are of economic importance, the following tables showing the number of specimens of each species taken each day will be of economic interest as showing the period of flight, when most numerous, the relative commonness of the different species, and many other questions of importance, as we shall see.

TABLE I.—*Clisiocampa americana* taken at Trap Lanterns in 1889:—

DATE.	MALES.	FEMALES.
June 17	1	
" 18	2	
" 20	4	
" 21	3	
" 22	6	
" 25	11	4
" 26	35	
" 27	85	8
" 28	46	5
" 29	100	33
" 30	61	25

Digitized by Google

TABLE I.—*(Continued).*

DATE.	MALES.	FEMALES.
July 1	62	6
" 2	30	
" 3	29	4
" 4	26	
" 5	7	1
" 6	1	1
" 7	1	
" 8	1	1
" 9	1	
" 18	1	
Total	513	88

TABLE II.—*Agrotids* taken at Trap Lanterns in 1889 :—

DATE.	*F. subgothica.*		*F. jaculifera.*	
	♂	♀	♂	♀
July 4				1
" 12	1			
" 17				1
" 21	2			
" 23	1			
" 26	1			
" 27	2			
" 28	1			
" 29	6			
" 30	2	2		
" 31	12	2		
Aug. 1	7	2		
" 2	19			2
" 3	9	1	1	
" 4	17	3	1	
" 5	39	4	3	
" 6	5			
" 7	3			
" 8	5		1	
" 9	32	1		
" 10	7	1	4	
" 11	9	2		
" 12	5			
" 14	30	3	1	2
" 15	59	1	2	
" 16	42		1	
" 17	76	10		2
" 18	124	3	1	
" 19	161	9	5	
" 20	198	6		
" 21	160	19	1	1
" 22	108	6		
" 23	63	2		
" 24	122	10		

Digitized by Google

TABLE II.—*(Continued).*

DATE.	*F. subgothica.*		*F. jaculifera.*	
	♂	♀	♂	♀
Aug. 25	209	8		
" 26	110	7		
" 27	90	2		
" 28	93	3		
" 29	97	4		
" 30	53	2		
" 31	108	6		
Sept. 1	60	8		
" 2	65	2	1	
" 3	50			
" 4	87	4		
" 5	23			
" 6	37	2		
" 7	8			
" 8	16	3		
" 9	1			
" 11	1	2		
" 14	1			
" 16	2	1		
" 17	1			
" 18		1		
Total	2240	142	22	9

One male of *Carneades redimicula* was taken on the 16th and a female on the 29th of July, and a female of *Carneades insignata* was caught July 11.

TABLE III.—*Lachnosterna* taken at Trap Lanterns in 1889 and 1892 :—

DATE.	*furca.*				*dubia.*				*ilicis.*			
	1889.		1892.		1889.		1892.		1889.		1892.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
May 6	1											
" 7	1											
" 8	1	1				1						
" 10					1							
" 11	1	1			2	1						
" 12					1	1						
" 13		1										
" 14	1	1			2							
" 16	1				6							
" 17	2	1			1							
" 18	8	1				2						
" 19	22				5	1						
" 20	4				4							
" 21	21				4	1						

Digitized by Google

TABLE III.—*(Continued).*

DATE.	*fusca.*				*dubia.*				*ilicis.*			
	1889.		1892.		1889.		1892.		1889.		1892.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
May 22	1	2			1							
" 25	16	2			4	3						
" 26			2		1							
" 28					1							
" 30			10	2	1			1				
" 31	1	2	8				2					
June 1	131	5			3				2			
" 2			3		2	1	1					
" 3	4	1	3		6		4					
" 4	13	1	1		2							
" 5	1	1				1						
" 6			1					1				
" 7			1				1					
" 8		1				1						
" 9	8	2			1				1			
" 10	11	3	2	1								
" 11	4	1	4									
" 13		1	12	1		1					1	
" 14	1	2	54	1				1				
" 15	6	1	13	1	1				1			
" 16	3		5						1			
" 17	3	2	11	1							3	
" 18	6		1									
" 19			1	1								
" 20	3	2	32	2							1	
" 21	1		35	2								
" 22	4	1	28	1		1	1					
" 25			2	1								
" 26	2								1			
" 27	8	1							1			
" 28	3		1	1					2			
" 29					1				1			
" 30	1								1			
July 1									5			
" 2	1								4			
" 3	1								1			
" 4									1			
" 5	1					1						
" 14											1	
" 19									1		1	
" 20									3		1	
" 28											1	
" 30									1		1	
Total	297	37	230	15	50	16	9	3	27		10	

In this table are also included the results of the specimens caught in one trap lantern which was kept running during 1892, from May 20 to Oct. 1. In 1889 there were also taken two specimens of *grandis*, June

Digitized by Google

20 and 27, both males; four *hirticula*, two males and two females, the former taken July 1 and 19, the latter June 14 and July 22; two males of *balia* taken June 1; two males of *hirsuta* taken May 20 and June 3; and one male of *quercus* was taken June 1. In 1892, one male of *grandis* was taken June 21; three males of *hirticula* on June 11, July 15 and 26; and two males of *hirsuta* were taken on June 2 and 3. Thus eight species were represented in the trap lantern material; at least twenty-three species should be found in our State.

From Table I. we learn that *Clisiocampa americana* flies from June 17 to July 18, occurring in the greatest numbers during a period of about ten days from June 26 to July 4; over 92 per cent. of the moths being taken at this time.

Table II. shows that *Feltia subgothica* is excessively abundant in this locality, nearly 2,400 specimens having been taken. I believe that more specimens of this moth were taken than of any other species of insect. Although the species flies from July 12 to Sept. 18, there is nothing to indicate more than one brood. Other experiments at the Insectary show that the insect hibernates in the larval state, and it is said that the change to a pupa takes place about July 1. As will be seen in the table, the adults appear in the greatest numbers from Aug. 14 to Sept. 6, over 97 per cent. of the moths being taken during these three weeks.

A glance at Table III. will show that *fusca* is by far the most numerous species in our vicinity; out of 694 specimens of *Lachnosterna* taken in the two years, 83 per cent. of them are *fusca*. *Dubia* and *ilicis* are comparatively common, while *hirticula*, *hirsuta*, *grandis*, *balia* and *quercus* are rare. In 1889 *fusca* flew from May 19 to June 10 and reached its climax on June 1, when 39 per cent. of them were taken. In 1892, however, *fusca* did not begin to fly until May 26 and stopped June 28, and it was the most numerous from June 13 to 28, or about two weeks later than in 1889. *Hirsuta*, *balia* and *quercus* seem to appear at about the same time as *fusca*, that is, during May and June. But *ilicis*, *grandis* and *hirticula* do not appear until the latter part of June and during July. No *Lachnosterna* were taken after July 30, although the lanterns were run until Oct. 15, thus indicating that the emergence of the beetles in the fall is very uncommon, if it happens at all. This is confirmatory evidence of the conclusion which Prof. Forbes, of Illinois, and Prof. Perkins, of Vermont, have reached in their recent

Digitized by Google

studies of these insects. In the case of the three species which fly later in the season, it is possible that they either pass the winter as pupæ or do not pupate until spring.

The most striking thing to be learned, however, from each of these tables is the great disparity in numbers between the males and females caught. The males greatly outnumber the females in every instance. Only about 17 per cent. of the *Clisiocampa americana* in Table I. were females. But a little over 6 per cent. of the *Feltia subgothica* in Table II. were females, while nearly 41 per cent. of *jaculifera* were of this sex. Less than 12 per cent. of the *Lachnosterna fusca* in Table III. taken in 1889, and but little over 6 per cent. of those taken in 1892, were females; with *dubia* the proportion of females is greater, being about 32 per cent.; no females of *ilicis* were taken in either year.

This great preponderance of the males over the females has also been noticed in every other species of the trap lantern material which has been studied of whatever order. It indicates that the males are much more active than the females, and is of the greatest importance when considering the insecticidal value of the trap lantern. For undoubtedly many of the males have copulated before being caught, and enough others remain uncaptured to fertilize the remaining females. Therefore the perpetuation of the species is provided for, and the insecticidal value of the lantern is rendered too small to be practicable.

BOOK NOTICE.

THE BUTTERFLIES OF NORTH AMERICA. Third Series, Part XIII.

Another part of Mr. Edwards's magnificent work has just appeared, and for beauty of illustration and interest of the letter-press, it perhaps surpasses all previously issued parts. The first plate shows the type of *Chionobas Chryxus*, var. *Calais*, Scudder, and the accompanying letter-press gives some interesting data collected by Mr. T. E. Bean concerning a similar form found at Banff, in the Rocky Mountains. The second plate shows in full all stages of the rare Canadian species, *C. Jutta*. This is accompanied by 14 pages of letter-press, in which nearly everything that is known concerning this species in America is related in a most entertaining manner. To the Rev. T. W. Fyles, F. L. S., of South Quebec, belongs the honour of being the only person so far who has reared *Jutta* from the egg to imago and described the different stages.

Digitized by Google

What the writer deems the most interesting feature in the life of this species is referred to, but Mr. Edwards's view of the matter seems to be different from his. Speaking of larvæ which hibernate after the first or second moult of a brood, part of which reach full growth the first autumn, he says :—"If any of these small larvæ run their full course, it seems certain that their butterflies should show themselves at least a month later than the 15th of June, and I do not understand why there is not a second flight." The writer has had the opportunity four times of breeding the species from the egg through the first winter, and all of the specimens hatched from eggs laid at Ottawa, Quebec, Banff and Nepigon, went into hibernation after the first or second moult ; one larva, however, of five sent by Mr. Edwards, fed straight on and reached full growth before winter set in. Those which revived the following spring fed slowly and did not attain full growth until the autumn, as related of this species and of *Chionobas Macounii* in Annual Report Ent. Soc., Ont., 1888, p. 7.

The third plate, also, figures two rare species of the same genus, which may be included in the Canadian fauna, *Crambis*, from Labrador, and a mountain species, named *Brucei* by Mr. Edwards, which has been taken by Mr. Bean, at Banff. The preparatory stages of the latter are beautifully illustrated in great detail, and it is seen that the larva resembles very closely that of *C. Semidea*. There are some critical notes concerning the synonymy of some allied species, which will be read with interest by students of this difficult genus.

We feel sure that all entomologists will hail with pleasure the appearance of this superb contribution to the knowledge of our Diurnal Lepidoptera, and we trust that the talented and genial author may be spared for many years to carry on this great work which has cost him so much.

J. FLETCHER.

[We were delighted to hear that Mr. Edwards has received a grant of $500 from the Bache Fund of the National Academy of Sciences to assist him in the completion of his publication on the Butterflies of North America.—ED. CAN ENT.]

Digitized by Google

NOTES.

LUMINOUS WORMS.

Driving from Hudson to Como on the 23rd of September, 1892, about 8 p.m., the night being warm and damp, I was much surprised to see on the hard road something luminous, emitting quite as strong a light as the glow-worm in England. We stopped quickly, but before I could get back the few yards it had disappeared. Some half mile further we passed another, which also, before I could get to it, disappeared. Can any of your readers say what these were? Their sudden disappearance and our failing to find them, though we struck a match in both cases, would lead me to think they were some sort of earth worm, as these draw themselves quickly into their holes when disturbed. How else is their sudden disappearance to be accounted for? LACHLAN GIBB.

The cells of *Megachile*, which I send, were found in rather a peculiar place last September, being attached to the trimmings of a dress which was inside a wooden chest placed on a gallery in Montreal.

LACHLAN GIBB.

CORRESPONDENCE.

LARVOPHAGOUS CATERPILLARS.

Sir: On reading in the issue of the CANADIAN ENTOMOLOGIST for January of Larvophagous caterpillars of *P. philenor*, I was reminded of an observation which I made last summer. I had at that time several larvæ of *Danias archippus* in a wire cage, and supplied them frequently with milkweed leaves, which they devoured voraciously. On one occasion, owing to a delay in getting leaves, their supply became exhausted, and in a short time—not more than an hour or two, I should think—one of them attacked another which was about to change to a chrysalis, and began eating it. Some of the others joined, and by the time the leaves were obtained fully half of the unfortunate caterpillar had disappeared. They ate it very slowly, not being hungry enough to relish it, I suppose. My brother tells me that he has seen a larva of *P. asterias* greedily eating the chrysalis of one of its kind which was hung on a fence.

WILLIAM L. W. FIELD, Guildford, Conn.

Mailed February 28th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, APRIL, 1893. No. 4.

SOME NEW LOCUSTIDÆ FROM INDIANA.

BY W. S. BLATCHLEY, TERRE HAUTE, INDIANA.

During the past four years the writer has been getting together a collection of *Locustidæ* from various parts of the State of Indiana, with a view of preparing a general descriptive paper of the species of that family found in the State. In working over the material thus gathered thirty-seven species are found to be represented, four of which are evidently new to science. Of the four, three belong to the genus *Orchelimum* and one to the genus *Conocephalus*. The former genus is represented in the collection by ten species and the latter by four. Below is given a description of each of the four species believed to be new, together with such notes concerning the distribution of each as I find in my field note-book.

CONOCEPHALUS, Thunberg.

Conocephalus palustris, nov. sp.

A small but comparatively heavy-bodied species, having the cone of the vertex devoid of black markings and without a basal tooth; ovipositor very short and broad; posterior femora armed beneath on both carinæ.

Cone of the vertex short and stout, the tip round, the deflexed front with a dull median carina. Pronotum short, broad, the posterior margin regularly rounded, the lateral carinæ well defined, the entire surface thickly and rather deeply punctate. Tegmina long and rather narrow, regularly rounded to the apex; of a more delicate texture than in either *C. ensiger*, Harris, or *C. robustus*, Scudder. Fore and middle femora with two short spines on the apical third of the lower outer carina. Hind legs short, the tibiæ but little more than half as long as the closed tegmina; the femora with plainly visible spines on both of the inferior carinæ, eight on the outer and six on the inner. Ovipositor a little shorter than the hind tibiæ, broadest at a point about two-thirds the distance from the base, thence tapering regularly to a sharp apex.

Digitized by Google

General colour a very bright grass green. Fastigium tipped with dull yellow, which extends half way down the sides. Labrum and apical segments of all the palpi a rose red tinged with violet. Tarsi somewhat infuscated. Antennæ and apical third of ovipositor reddish-brown.

Measurements.—Female—Length of body, 27 mm.; of fastigium in front of eye, 2.75 mm.; of pronotum, 7 mm.; of tegmina, 37 mm.; of hind femora, 20 mm.; of hind tibiæ, 19.5 mm.; of ovipositor, 19 mm.

This handsome species of *Conocephalus* belongs to the same group as *C. robustus* and *C. crepitans*, Scudder, but is smaller and of a more uniform and brighter green than either of those species, besides having shorter legs, ovipositor, etc. It is described from a single female taken October 24, from the fallen grasses on the margins of a large low-land pond in Vigo county. This pond is surrounded on all sides by heavy timber, and its margins have yielded a number of interesting Orthoptera found nowhere else in the county. Among them are *Leptysma marginicollis*, Serv., *Paroxya atlantica*, Scudder, *Anaxiphus pulicarius*, Sauss., *Phylloscirtes pulchellus*, Uhler, and *Xiphidium nigro-pleurum*, Bruner. The first four mentioned are insects of a southern range, and perhaps *C. palustris* will in time be found to be more common southward.

ORCHELIMUM, Serville.

Orchelimum indianense, nov. sp.

A slender-bodied insect, with a dark median streak down the face, and having the posterior femora unarmed beneath. The cone of the vertex is short, rather narrow, with a rounded apex. The tegmina narrow, tapering, a little shorter than the wings, and of a delicate, almost gauze-like, texture. Posterior femora slender, shorter than the closed tegmina. Anal cerci of male of medium size, longer than the subgenital plate, tapering to a dull point; the basal tooth short, with a broad base and a very sharp point. The ovipositor of female of less than average width and length, the apical half with a gentle upward curve.

Colour of dried specimens: Tegmina and wings a transparent whitish, tinged with green on the front or lower, longitudinal nerves; the cross nervules of the latter darker. Sides of pronotum and abdomen, and all the femora, light green; the tibiæ and tarsi of a brownish hue. Face yellowish-white, with a dark fuscous stripe, the width of the labrum, starting with the mouth and passing upward to the vertex, where it narrows to the width of that organ; then, broadening on the occiput, it passes back to the front border of the pronotum, where it divides into

Digitized by Google

two narrow streaks, which enclose a whitish area and extend a little beyond the posterior transverse suture, where they taper to an end. Subgenital plate of male yellow. Basal third of ovipositor dark brown, the remainder light reddish-brown.

Measurements.—Length of body, ♂, 17 mm.; ♀, 17.5 mm.; of pronotum, ♂ and ♀, 4 mm.; of tegmina, ♂, 20 mm.; ♀, 18 mm.; of hind femora, ♂, 14 mm.; ♀, 14 5 mm.; of ovipositor, 7.5 mm.

This graceful and prettily marked species was found to be quite common among the rank grasses and sedges growing about the margins of a tamarack swamp near Kewanna, Fulton county. It was first taken on August 26th and again on September 24th, when it appeared more plentiful than before. It is the smallest and most slender of the ten species of the genus so far known to occur in the State, and its markings are very distinct from those of any of the others.

Orchelimum campestre, nov. sp.

A species of less than medium size, with the wing-covers narrow and of almost equal width throughout, the posterior femora unarmed beneath, and the ovipositor short and narrow.

Cone of the vertex prominent, narrow, rounded at the apex; the sides of the frontal deflexed portion rapidly converging to form a very acute wedge. Wing-covers long, narrow, not widened in the middle as in *O. vulgare*, *concinnum*, etc., tapering slightly on the apical third to a rounded end; their length equalling that of the wings in the ♂, a little shorter in the ♀. Posterior femora with the basal half quite stout, the length less than that of the tegmina. Cerci of male slender, cylindrical, somewhat pointed, the apical half curved slightly outwards, the basal tooth short and weak. Ovipositor short, narrow, moderately upcurved, and tapering to a delicate point.

Colour.—Tegmina and wings almost uniform transparent olivaceous brown. The usual dark reddish-brown band upon the occiput and disk of pronotum is margined on the latter with two very narrow and darker brown stripes, which extend back to the middle of the posterior lobe of the pronotum. Face, and usually the hind femora, a dirty olive brown; the latter, when dry, with a blackish longitudinal band on the exterior face. In the female the only green on the body is on the lower part of the sides of the pronotum and on the anterior femora. The only male at hand has the posterior femora green, but otherwise is coloured like the females. Ovipositor light reddish-brown.

Digitized by Google

Measurements.—Length of body, ♂, 17.5 mm.; ♀, 19 mm.; of pronotum, ♂, 4.5 mm.; ♀, 5 mm.; of tegmina, ♂, 20.5 mm; ♀, 24.5 mm.; of antennæ, ♂, 46 mm.; of posterior femora, ♂, 17 mm.; ♀, 17.5 mm.; of ovipositor, 7 mm.

This dull coloured grasshopper has been found in small numbers in both Vigo and Fulton counties, in upland prairie meadows, where it frequents the tall grasses, usually in company with *Xiphidium strictum*, Scudder.

It is a smaller and more slender bodied insect than the common *O. vulgare*, Harris, and has a shorter and narrower pronotum and a much smaller ovipositor than that species.

Orchelimum Bruneri, nov. sp.

A species of about the same length, but less robust than *O. vulgare*, Harris, having the posterior femora armed beneath, and the ovipositor very broad, nearly straight and of more than average length.

Cone of the vertex narrow, moderately elevated, rounded at apex. Tegmina long and narrow, a little shorter than the wings. Posterior femora rather stout, the apex, when appressed, not quite reaching the tip of ovipositor; armed beneath on the apical half with three or four small spines. Cerci of male stout, acuminate, with the internal tooth prominent.

Ovipositor very similar to that of *O. gladiator*, Bruner, being very long and stout, nearly straight above, and with the under side of apical third sloping rapidly to the acute apex.

Colour of dried specimens.—With the exception of the ovipositor, which is a light reddish-brown, and the usual stripe on occiput and disk of pronotum, the whole body is a pale, transparent brownish-green, the green showing plainly only on the lower half of the side of pronotum and on the meso and metapleura. The reddish-brown dorsal stripe of occiput and pronotum is bordered laterally throughout its *entire* length with a very narrow one of much darker brown. When immersed in alcohol the reddish-brown stripe fades to a yellowish white, leaving the two lateral ones as prominent dark streaks, widest on the central portion of the frontal disk.

Measurements.—Length of body, ♂, 18 mm.; ♀, 20.5 mm.; of tegmina, ♂, 21 mm.; ♀, 25 mm.; of pronotum, ♂ and ♀, 4.75 mm.; of hind femora, ♂, 16.5 mm.; ♀, 18 mm.; of ovipositor, 10 mm. Described from 2 ♂s and 4 ♀s.

Digitized by Google

This species, the female of which is at once conspicuous by reason of the shape and size of its ovipositor, has been taken in small numbers only in Vigo Co., where it is found during August and September on the leaves and stems of a tall, broad-leaved knot-weed, *Polygonum amphibium*, L., which grows luxuriantly in the shallow waters about the margins of two or three large ponds in the Wabash River bottoms. Several other "green grasshoppers," notably among which are *Xiphidium attenuatum*, Scudder, and *Orchelimum nigripes*, Scudder, frequent this plant in immense numbers. Keeping company with them an occasional specimen of *O. Bruneri* is seen, but, being an active leaper, it often escapes amidst the dense foliage of the knot-weed before its capture can be effected. Its less robust body and longer armed posterior femora will readily distinguish this species from *O. gladiator*, the only other one which, to my knowledge, has an ovipositor shaped like that of *Bruneri*. The latter is named in honor of Prof. Lawrence Bruner, of Lincoln, Nebraska, one of the leading authorities on N. A. Orthoptera.

ON SOME BUTTERFLY LARVÆ NOT HITHERTO DESCRIBED.

BY HARRISON G. DYAR, BOSTON, MASS.

PHYCIODES CARLOTA, Reak.

Larva.—Head subcordate, apices slightly produced, mouth parts small; rough, tuberculate, hairy; colour black, a narrow white line above the mouth. Body robust, with short and thick conical, densely-bristly spines, arranged thus: on joint 2 one short stigmatal and one substigmatal, besides tubercles on the cervical shield; on joints 3–4, subdorsal, lateral and subventral; on 5–11, dorsal (single), suprastigmatal, substigmatal, 2 subventral; on 12, two dorsal (in line), subdorsal, superstigmatal, substigmatal and subventral (small); on joint 13, two subdorsal (in line). Cervical shield, anal plate, feet outwardly and spiracles black; body brownish-red, with a dorsal and subdorsal black shaded line, most distinct in the segmental incisures.

Pupa.—Straight on ventral side; thorax with no prominence; abdomen arched, with five rows of slight blunt points, which also occur on thorax at the angulations, but slighter. Colour grayish, dull brown mottlings on a white ground. Length, 14 mm; width, 4 5 mm. Found on the ground feeding on an undetermined plant which was just starting, at Denver, Colorado, April 30, 1891.

Digitized by Google

THECLA GRUNUS, Boisd.

Larva.—Head testaceous, with a black shade on each side; width, 1.2 mm. Retracted beneath joint 2. Body flattened, tapering somewhat posteriorly but rounded, the segments arched. A subdorsal and subventral ridge, not very prominent. Dark or bluish-green, without white granulations, but having minute, brownish, piliferous dots, quite densely distributed. Obscure geminate dorsal, single subdorsal, stigmatal and subventral lines, pale whitish and broken, becoming later yellowish, and the subdorsal one distinct and almost continuous. The two subdorsal lines are 2.2 mm. apart. The pile on the body is longer and stiffer on the subventral ridge than elsewhere. A rounded, diamond-shaped, depressed, cervical shield situated about the centre of joint 2, on which the blackish, elevated, piliferous dots are smaller than elsewhere.

Chrysalis.—Suspended by the cremaster and a loop of silk. Short, thick, flat on the ventral side, rounded dorsally, with a very slight depression between the thorax and abdomen. Colour pale green, speckled with blackish (but faintly); a bright yellowish subdorsal line on the abdomen, faintly continued on the thorax, and a double dorsal row of yellowish dots on the abdomen.

Duration of this stage, fifteen days.

Food plant.—The young leaves of the live oak (*Quercus chrysolepis*, Liebm.). Larvæ from Yosemite, Cal.

NEW NORTH AMERICAN MICROLEPIDOPTERA.

BY PROF. C. H. FERNALD, AMHERST, MASS.

Crambus albilineellus, n. sp.

Expanse of wings, 26 mm. Head, palpi, thorax and fore wings dull ochre-yellow. The palpi are darker on the outside, and the subcostal, median and veins 5 to 10 are white. A stripe of lead-coloured scales extends from the base of the wing just above and parallel to vein 1 to the outer cross line, and a similar stripe occurs between this and the hind margin. Two lines cross the wing: The first is dark brown, and arising from a point a little before the middle of the costa forms an outward angle very near the costa and an inward angle on the subcostal vein, then a second outward angle is formed at the end of the median vein and from this point the line runs more or less distinctly across to the middle of the hind margin. The second line is dark brown but finer, dentate and edged on the outside with lead coloured scales, and runs from the costa before

Digitized by Google

the apex across to near the outer margin, thence across the wing nearly parallel with the outer margin. The space from the end of the cell to the apex is somewhat stained with brown. The terminal line is fine, black, and with a row of black dots in it. The fringe is concolourous with the adjacent part of the wing, but with slight metallic reflections. Hind wings fuscous, fringe lighter.

Described from one specimen taken in Southern California.

Crambus coloradellus, n. sp.

Expanse of wings, 22 mm. Head, palpi, thorax and fore wings, pale silvery straw colour; the palpi darker on the outside. A white stripe extends from the base of the wing through the cell to the outer margin, bifid beyond the cell. All the veins of the wing are more or less indicated by pale yellow, edged on each side with a more or less broken row of black scales. A pale yellow line crosses the wing at the end of the cell where it rounds outwardly and runs nearly straight and vertical to the hinder margin. The outer line is curved within the apex and runs straight to the hinder margin. Both of these lines are faint, and the outer one is edged on the outside with silvery scales. The terminal row of black dots is in a straight line, and does not follow the margin at the lower part where it rounds outwardly. Fringes silvery metallic. Hind wings white, slightly stained with pale fuscous on the apex.

Described from one example from Colorado.

Alucita fishii, n. sp.

Expanse of wings, 20 mm. Thorax and fore wings pure white, the latter with a few brown atoms scattered over the costal part of the wing, and more abundant before the fissure, where it almost defines itself as a triangular spot with a curved outer side reaching to the costa, and beyond which on the costa are two equidistant brown spots. Fringe pure white. Hind wings and their fringes pure white. Abdomen white, head wanting in the single specimen before me, which was taken in Nevada by the late Mr. H. K. Morrison.

I name this species for Mr. Charles Fish, of Brunswick, Me., who did such excellent work on our "feather wings" some years ago.

Alucita elliottii, n. sp.

Expanse of wings, from 23 to 25 mm. Head pale yellow (?). Thorax and fore wings pure white, the latter with a brown point before the cleft, an elongated brown spot on the costa over the base of the cleft, and a few brown atoms along the basal third of the fold. Hind wings and all the fringes pure white.

Digitized by Google

This insect was received from the late Mr. Elliott, who bred it at his home in New York, but on what plant I did not learn.

Alucita eupatorii, Fern.

In 1855, Dr. Asa Fitch, in his first report as Entomologist of New York, published the description of his *Pterophorus cretidactylus*. In 1874, Prof. P. C. Zeller, in his "Lepidoptera der Westkuste Amerika's," described what he supposed to be Fitch's *cretidactylus*, under the generic name *Œdematophorus*, and it was again referred to by Lord Walsingham in his "Pterophoridæ of California and Oregon," who sent specimens to Zeller for determination, and also kindly gave me specimens of this as well as of nearly all of the species he described.

Mr. Charles Fish took up the study of our Pterophoridæ and described several species in this journal, and later purchased the types of Dr. Fitch, when he discovered that the species that had been so well described by Prof. Zeller was not Fitch's species. Finally I purchased Mr. Fish's collection, including not only his own types but also those of Dr. Fitch. I was then able to verify the determination of Mr. Fish, and with him to discover that Lord Walsingham had redescribed the true *cretidactylus*, Fitch, under the name of *Œdematophorus occidentalis*. The *cretidactylus* of Zeller not being the true *cretidactylus* of Fitch, must have a new name, and as it has been bred from *Eupatorium purpureum* by Mr. Elliott, I have given it the specific name of *eupatorii*, as above.

Coriscium cuculipennellum, Hb.

I have received this species from Mr. M. V. Slingerland, of Cornell University, who bred it from ash at Ithaca, N.Y. This European species has not been observed in this country before, and is probably a recent importation. I am under obligations to Lord Walsingham, who compared it with the European species, and determined it specifically for me.

Mr. Slingerland also sent me what I believe to be a new species of *Carposina*, which he bred on currant. He wrote me as follows:—"The egg is laid on or within the berry, and the larva feeds upon the pulp, and sometimes the seeds, confining its work to a single berry. The fruit soon dropped, and the larva left the berry, went into the ground and there pupated. The adults appeared in the spring about the time the currants were turning red. There was only one brood during the season."

The specimens received from Mr. Slingerland were in very poor condition, and I have decided not to describe the species till better specimens are obtained.

The genus *Carposina* has been placed among the Tineids, but it should be placed near *Conchylis* among the Tortricids.

Digitized by Google

HINTS ON COLLECTING COLEOPTERA DURING THE WINTER.

BY A. FORD, ST. LEONARDS-ON-SEA, SUSSEX, ENGLAND.

During the winter the coleopterist in Britain finds a great deal to do in the way of collecting, as many species are to be met with at this season, which will probably not be found at any other period of the year. One of the principal methods of collecting during the winter is "tuft-cutting", and it is astonishing the number of beetles which pass through the winter in tufts of grass. Those growing in damp places in woods and on the borders of ponds and streams are generally the most productive. They should be cut off close to the roots, then shaken and pulled to pieces over a sheet of paper, which should be very carefully examined, otherwise many of the more minute species will be passed over. If the weather is too severe for this sort of work, the collector should provide himself with a strong canvas bag, into which the tufts can be shaken, and the contents can then be examined at home at his leisure. Moss is also very productive at this season. Vast numbers of beetles may be found hibernating in moss in sheltered situations. This should be examined in the same way as the tufts. Haystacks are also good hunting grounds for the coleopterist. The loose refuse underneath the stack is usually the best part to work. Piles of faggots and logs in woods generally repay the collector for a careful examination. Numbers of beetles are to be found at the roots of grass, especially on sandy banks, where the grass grows in patches. They are always found as close as possible to the roots, and many of them harmonize so well with the ground that it requires a very careful search to discover them. By carefully working a bank of this description one winter I obtained over one hundred species of Coleoptera, including several "rarities". I may add, the bank was only about thirty yards long by two broad. Of course, there are many species of wood-boring beetles to be found in the winter months, as also many others which occur in various species of fungi.

A diligent collector will doubtless add many species, and probably some "rarities" to his collection, if he takes the trouble to look for them during the winter months, and if the foregoing remarks prove of any service to those interested in Coleoptera, I shall be amply repaid for the trouble of writing them.

Digitized by Google

THE BUTTERFLIES OF GRAND RAPIDS, MICH.

BY ROBT. H. WOLCOTT.

Grand Rapids, Michigan, is situated in the western part of the State, thirty miles from Lake Michigan, in N. lat. 42° 58', in W. long. 85° 40', with an altitude of between 600 and 700 feet. The underlying formation, outcropping in the bed of the river, is the subcarboniferous limestone, and the soil is for the most part a sandy or gravelly loam. The surface of the surrounding country is rolling and diversified by numerous small lakes, with tamarack swamps and peat bogs scattered here and there. The timber is mainly hard wood, but now and then an aged, solitary, pine or a group of younger pines in an out-of-the-way nook reminds us of the fact that we are within the limits of the pine region, while much of the land formerly covered by pine is now occupied by a growth of low oak scrub. The flora is of a mixed character, the locality being just within the pine belt, and the Grand River valley also forming the northern limit of many southern species, such as the papaw, tulip-tree, honey locust, flowering dogwood, tupelo, etc. The mean annual temperature is about 47°, and the average annual rainfall about 36 inches, while the season lasts usually from the middle of April to the fore part of October. The fall of 1890, however, was an unusually late one, and many species were on the wing till the end of October, *Colias philodice* being seen even on the 6th (about a dozen) and on the 20th (one) of November.

The following list of species is the result of ten years' observation, and covers the immediate vicinity of Grand Rapids within a radius of about ten miles :—

1. *Danais archippus.*—Very common. Appearance as follows: The hibernating individuals, from the middle of May to late in June; of the first brood, the larvæ in June, the butterflies from early in July to August 15th; of the second brood, the larvæ late in July and early in August, the butterflies from the end of August to the middle of September; of the third brood, the larvæ in September, the butterflies in October and, after hibernation, again the next May. It is thus three-brooded, and if we disregard the time spent in hibernation, the life of each brood is from two to two and a-half months. It is a very strong flyer, and is often seen hovering about the tops of trees at a considerable distance from the ground, especially near sunset, when seeking a hiding place for the night.

Digitized by Google

2. *Euptoieta claudia.*—One specimen; Lamberton Lake, in July, 1887.

3. *Argynnis idalia.*—Rare. Taken at Lamberton Lake during the early part of July; is not as strong a flyer as are our other larger Argynnids.

4. *Argynnis cybele.*—Common. From the end of June to the middle of August, frequenting, with the other species of the genus, low, wet ground.

5. *Argynnis aphrodite.*—Common. Flies from about the first week in July to the end of August.

6. *Argynnis alcestis.*—Not rare, but less common than the preceding, from which it may be told in most cases, even on the wing, by its more ruddy colouring.

7. *Argynnis myrina.*—Common. Two broods during the season, the first flying from June 10th to the middle of July, the second from the early part of August through September. A worn specimen was taken in 1890 as late as the 8th of October. Prof. E. A. Strong, once of this place, now of Ypsilanti, Mich., is of the opinion that this species was formerly rather rare.

8. *Argynnis bellona.*—Common. Two-brooded, appearing from May 10th to June 15th, and from July 1st to August 15th.

9. *Melitæa phaeton.*—Common at several localities, from which, however, it never strays. One damp, boggy meadow, where it was formerly very abundant, has been recently drained and part of it cultivated, the result being the extinction of the species at that place. Here were taken all of the three specimens of the var. *superba*, of the capture of which I know. The species flies from the end of June to the latter part of July.

10. *Melitæa harrisii.*—Rare. Taken over low meadows from the middle of May to the middle of June.

11. *Phyciodes nycteis.*—Sometimes quite common. Two-brooded, appearing in June and again in August.

12. *Phyciodes carlota.*—One specimen, the date of which is lost, but taken, I think, early in June; a fresh example.

13. *Phyciodes tharos.*—Common. Two broods; the first form, *morpheus*, flying from June 10th to July 15th; the second, *marcia*, from the early part of August into September. A worn specimen was taken October 8th, 1890.

Digitized by Google

14. *Grapta interrogationis.* — Common most years, some quite abundant. Flies in early spring up to June 15th; the larvæ of the first brood appear about the end of June, and the butterflies are on the wing from July 10th to the end of the month; a second brood of larvæ is found about that time, and these give butterflies from the 10th to the end of August; the third brood flies late in fall and hibernates. The hibernating butterflies are mostly *fabricii*, while *umbrosa* is more abundant in the summer broods.

15. *Grapta comma* —Common. Flies from early spring to the first of June, again, the form *dryas*, from July 1st to August 15th, while the second and hibernating brood appears late in the fall.

16. *Grapta progne.*—Rather common. Early in spring, again in July and August, and a second brood late in the fall hibernating.

17. *Grapta j-album.*—Not common, though much more so than formerly. Appears early in September, and flies throughout the fall and again in early spring. Our hardiest butterfly, appearing at any time in the winter that the weather is at all favourable. Under date of January 3rd, 1892, I have this note: "Coldest day of winter thus far, the thermometer registering, at 7 a.m., 11°, and though the sun shining brightly all day, the snow only melting in sheltered spots. At 4 p.m. took a *G. j-album* resting, wings erect, on the snow in the middle of the sidewalk of a well-travelled street. Was chilled, but soon revived in the house." All the Graptas, together with *Van. antiopa*, are common early in the spring around trees from which sap is flowing.

18. *Vanessa antiopa.*—Very common. Sometimes becoming a pest by defoliating young elms. Usually three-brooded, the hibernators flying from early spring to the end of May, the larvæ of the first brood appearing early in June, and the butterfiies from the 10th of the month to the 20th of July; the larvæ of the second brood are found in the fore part of July, the butterflies during August; of the third brood, the hibernating individuals, the larvæ in September, the butterflies from September 20th onward.

19. *Vanessa milbertii.*—Common; inclined to be local. Three broods, appearing as follows: The hibernating specimens from early in spring to June 15th; of the first brood, the larvæ during the latter part of May and early in June, the butterflies from the end of June to July 15th; the larvæ of the second brood in July, the butterflies during

Digitized by Google

August; the larvæ of the third or hibernating brood during the latter part of August, the first butterflies about September 20th. I have noticed in a few instances the construction of a web by colonies of young larvæ.

20. *Pyrameis atalanta.*—Common. Two-brooded. The hibernating individuals are seen from the end of April to the latter part of June; the larvæ of the first brood may be found in June, the butterflies from July 10th to August 15th; the larvæ of the second brood during August, the butterflies from the 15th of September.

21. *Pyrameis huntera.*—Common. Two-brooded, flying in the latter part of June and in July, and again in September and October, being then most abundant in clover fields. Hibernating specimens occur, no doubt, early in spring, but I have no record of observations at that time.

22. *Pyrameis cardui.*—Usually common, but some years quite infrequent. In 1884 was very abundant throughout the season, the thistles and burdocks being stripped, and the nettles, mallows, sunflowers and hollyhocks also attacked. It is usually two-brooded, flying from the latter part of May through June; again, from larvæ in June, in July and August; and again, the second brood of the year, from the second week in September onward.

23. *Limenitis ursula.*—Rather common, though formerly rare. Two-brooded, flying during June and early July and again in the latter part of August. It is very much attached to certain localities, and in one door yard for several years it has never failed to appear, at any time during its season, one having to wait but a few minutes to see one or more. It likes to fly along paths in woods and, like *disippus* and the species of *Pyrameis*, *Grapta* and *Vanessa*, has the bad taste to frequent heaps of decaying animal and vegetable refuse.

24. *Limenitis disippus.*—Common. Two-brooded. The first brood flies during June, the second from August 15th through September, one being seen on one occasion on the 8th of October. It frequents especially willow bushes lining the banks of streams.

25. *Apatura clyton.*—One specimen of the form *proserpina* taken by Mr. L. S. Livingston, a former local collector, a few miles east of the city, on the 15th of July, 1885. I am also informed by Prof. E. A. Strong that two or three were taken near the city some years ago.

26. *Neonympha canthus.*—Common during July, frequenting low grounds and swampy meadows.

Digitized by Google

27. *Neonympha eurytris.*—Common. In June in open woods.

28. *Neonympha mitchelli.*—July 1st, 1885, three years before the species was described, I found it rather common near South Grand Rapids in company with *canthus*, but had neither specimens nor authorities from which to pronounce upon its newness. Have found it quite common at the same locality, a bog some two acres in extent, every year since, from the 1st to the 15th of July. It is readily told on the wing by its dark colour, small size, and weak flight; but owing to its fragility and its habit of flitting low amongst grass and weeds, perfect specimens in any number are difficult to obtain.

29. *Satyrus alope.*—Formerly found here, as I learn from older collectors, but disappeared several years ago.

30. *Satyrus nephele.*—This form is now common in July at two or three localities—low, wet meadows—and specimens are found of the var. *olympus* and others approaching var. *nephele.*

31. *Libythea bachmani.*—One specimen taken in August, 1883, by Mr. C. S. Osborne, a local collector, and another by myself in 1887. August 21, 1885, Mr. L. S. Livingston found a nearly full-grown larva of this species beneath a hackberry tree at the same locality at which the butterflies were captured, and at which the *Apatura clyton* was taken.

32. *Calephelis borealis.*—Taken in July at two or three localities, but only at all common in two low, wet, grassy areas near Lamberton Lake, each less than an acre in extent.

33. *Thecla acadica.*—Common in July, frequenting especially the flowers of butterfly-weed and New Jersey tea.

34. *Thecla edwardsii.*—Rather common, in company with the next, late in June and early in July, on the leaves of low scrub oaks.

35. *Thecla calanus.*—Quite common, and like the preceding, has a curious habit when resting on a leaf of rubbing the upper surfaces of its wings together, giving the tails an upward and downward motion.

36. *Thecla strigosa.*—Rare. July, on the butterfly-weed and New Jersey tea.

37. *Thecla niphon (?)*—In my notes under the date of May 2, 1885, I have this observation: "A *Thecla (Niphon ?)* was seen but was unable to capture it." This could have been none of the other species named, and from the date and our being in a pine region, am inclined to think it this species.

Digitized by Google

38. *Thecla titus.*—Common. Appearing about the middle of July and flying a month or so, frequenting particularly the butterfly-weed.

39. *Chrysophanus thoe.*—Common, especially in tracts of blue flag from June 10th to the 1st of July, and from August 15th to the middle of September.

40. *Chrysophanus epixanthe.*—Very common at Lamberton Lake, flying over tracts of shrubby cinquefoil *(Potentilla fruticosa)*. I have taken it from June 10th to September 19th, and it is common at all times between, though I think there are two broods in reality.

41. *Chrysophanus hypophlœas.*—Common. Flies from May 10th to June 15th, from July 15th to August 15th, and again from September 20th to October 9th, when I have seen worn specimens. It is thus apparently three-brooded, but I believe that of the larvæ from the summer brood some mature and give imagos in the fall, while others go over to spring, and that it is really two-brooded.

42. *Lycæna lygdamus.*—Rare. Late in April and early in May along muddy cow-paths. Very local.

43. *Lycæna pseudargiolus.*—Form *violacea* is not common, appearing in April and early May, while *neglecta* is a common form from June 10th to the latter part of August, and seems in some specimens to approach var. *pseudargiolus.*

44. *Lycæna comyntas.*—Common in May on willow blossoms. Again found from July 15th to August 15th, delighting in wet, muddy places in woods. In 1890, fresh specimens were taken again September 20th, but I believe these were disclosed from chrysalides which should have gone over till the next spring.

45. *Pieris protodice.*—Very common in fall from August 10th to the end of September, but the spring form, *vernalis*, is rather rare, appearing from the end of April to the middle of June.

46. *Pieris oleracea.*—Not common. Low ground; in May and again in July and August.

47. *Pieris rapæ.*—Very common. Several broods, appearing continually throughout the season. The earliest of my dates is April 7th, the latest October 13th. The species was here when I began collecting in 1883 and I have taken it ever since. Am unable to give the date of its first appearance.

48. *Meganostoma cæsonia.*—Formerly found here, I am told, but rare.

49. *Colias eurytheme.*—Once seen, July 20th, 1886.

Digitized by Google

50. *Colias philodice.*—Very common and producing about four broods in a season, its appearance some seasons being nearly continuous from the first of May to the end of October, and in 1890 seen November 20th. Occasionally in spring a form resembling *anthyale* is seen, expanding but 1.5 inches. Var. *alba* is more abundant in the late summer broods. A third variety occurs which I have nowhere found described, but which is distinct from any variety given in Smith's List, and seems to me to merit a varietal name.

Colias philodice, var. *luteitincta*, nov. var.—Differs from the normal *philodice* in the possession of an orange shade upon the primaries extending from the middle of the posterior margin to the median vein, shading off in all directions into the yellow ground colour, and occupying exactly the position of the orange patch in *Col. eurytheme*, var. *ariadne*. The secondaries also in most specimens show an orange flush in the central portion. I first met this form in company with *eurytheme* and *philodice* in August, 1885, at Batavia, Ills., and supposed the specimens to be hybrids. But have since taken it at different times at Grand Rapids, where *eurytheme* has been seen but once, and have collected in all about a dozen specimens, one of them a female. I find the colouring very constant and sufficiently marked to distinguish the form even when on the wing. Have recently seen a specimen in a collection at Lansing, Mich. Edwards figures an orange variety and suggests the possibility of its being a hybrid between the two species, *eurytheme* and *philodice;* it is not like this and appears much more likely to be, as suggested, a hybrid.

51. *Terias lisa.*—Rare. One specimen taken east of the Michigan Soldiers' Home, August 10, 1891.

52. *Papilio ajax.*—Formerly rare, but has been becoming constantly more common with the spread of the papaw, upon which it feeds, till now it is very common in the southern part of the country and quite so at Grand Rapids, especially in the vicinity of its food-plant. Vars. *telamonides* and *walshii* fly from the early part of May to the latter part of June, and *marcellus* from the end of July to the end of September.

53. *Papilio turnus.*—Common from the end of May to the early part of July, congregating about wet places in roads, etc. Var. *glaucus* is rare. Two specimens have been taken on the wing and one reared from a larva collected on cultivated cherry.

54. *Papilio cresphontes.*—Not uncommon in June.

Digitized by Google

55. *Papilio asterias.*—Rather common. Two-brooded, the first being on the wing from the end of May to the first of July, the second during August and fore part of September.

56. *Papilio troilus.*—Our most common *Papilio.* Two-brooded, flying from the middle of May to the end of June, and from the beginning of August to September. In one case a battered specimen was taken September 25th.

57. *Ancyloxypha numitor.*—Common. One brood in June and another in August. Flies in low, wet meadows.

58. *Thymelicus poweshiek.*—Common at Lamberton Lake in July. In flight and habits generally much like the preceding.

59. *Pamphila hobomok.*—Common. June. More abundant at certain localities, and, like all the species of *Pamphila*, seems to prefer low, swampy tracts and wet meadows. Several specimens of the var. *pocohontas* have been taken.

60. *Pamphila sassacus.*—Rather common in June in company with *mystic* and *peckius.*

61. *Pamphila leonardus.*—Rare. Flies from August 10th to the end of the month.

62. *Pamphila egeremet.*—Not common. July.

63. *Pamphila peckius.*—Very common. Apparently two-brooded, one brood appearing early in June, the other during the first week in August.

64. *Pamphila mystic.*—Common. From early June to the middle of July.

65. *Pamphila cernes.*—Very common. Two broods during a season, one flying from June 10th to July 15th, the other from August 15th to the end of September. In 1890, took a fresh female on October 4th. A female taken in July, 1892, differs from the normal form in an almost entire lack of fulvous in the cell.

66. *Pamphila manataaqua.*—One specimen, July 14th, 1892.

67. *Pamphila metacomet.*—Rather rare. Flies during the latter part of July.

68. *Pamphila bimacula.*—One female taken July 20th, 1892.

69. *Pamphila pontiac.*—Common in July. Have a male specimen in which the under surface of one secondary is suffused with brownish so as to completely obscure the normal pattern of the wing.

70. *Pamphila dion.*—Common in July, last year, at one locality in company with *pontiac*, and upon the wing much resembling that species,

Digitized by Google

The range is much wider than given in French, as I have specimens from Western New York.

71. *Pamphila delaware.*—Usually not very common, but last year was quite abundant at two or three localities. Flies in July.

72. *Nisoniades brizo.*—Not common. Appears early in May.

73. *Nisoniades icelus.*—Rather common from the end of May, through June, and once taken, a battered example, as late as July 14th.

74. *Nisoniades lucilius.*—Found, but not common, in June.

75. *Nisoniades persius.*—Not common. Flies about the end of May.

76. *Nisoniades juvenalis.*—Common in June. The species of *Nisoniades* seem to appear in spring about in this order: first *brizo*, then *icelus*, *persius* and *juvenalis*, and lastly *lucilius*. They all delight in recent clearings in the woods and in tracts of bushes, stumps and brush-heaps.

77. *Pholisora catullus.*—Common. Two-brooded, appearing in June and again in September, the second brood being especially common around door yards and waste places where grow different species of *Amarantus*, especially *A. albus*. The larvæ are also found on *Chenopodium album*.

78. *Eudamus pylades.*—Quite common. Seen in spring from the middle of May to the middle of June, preferring open woods.

79. *Eudamus tityrus.*—Common. From the end of May to the middle of July, but seems to prefer a solitary life and more than two or three are never seen at any one time.

From this list it appears that 79 species of butterflies have been taken at this locality; one or two remarks, perhaps, would be of value concerning certain ones. As to the Papilios, from information received from Prof. E. A. Strong, who began to collect at this place some thirty years ago, it appears that *troilus* has constantly grown more common, and *asterias* and *turnus* less so; *ajax* was once extremely rare, and the first *cresphontes* was not taken till some years after Mr. Strong came here, though he is unable to give me the exact date. *Pieris rapæ* has, of course, appeared in comparatively recent times, and as it has become more common, Mr. Strong thinks *protodice* has decreased in numbers, while *oleracea* is certainly much less common than it was ten years ago. *Sat. alope*, once taken, has disappeared and *nephele* become common, but not however at the same locality. *Arg. myrina*, *Grapta j-album* and *Lim. ursula* have also grown more common of recent years.

Digitized by Google

I desire in closing to call attention to one locality near this city which is, it seems to me, a remarkably productive one, and that is the vicinity of Lamberton Lake. Upon one day last summer, July 14th, I observed there 34 species, in a tract less than a mile in length :—*Dan. archippus*, *Arg. aphrodite*, *alcestis*, *myrina*, *bellona*, *Mel. phaeton*, *Phyc. nycteis* (worn), *tharos*, *Grapta comma* var. *dryas*, *progne*, *Van. antiopa*, *Lim. ursula*, *disippus* (worn), *Neon. canthus*, *eurytris*, *Sat. nephele*, *Cal. borealis*, *Thecla acadica*, *edwardsii*, *calanus*, *Chrys. hypophlœas*, *epixanthe*, *Pier. rapæ*, *Col. philodice*, *Pap. asterias* (one), *Thym. poweshiek*, *Pam. peckius*, *cernes*, *pontiac*, *egeremet*, *mystic*, *delaware*, *manataaqua*, and *Nis. icelus* (worn). A very long list, it seems to me, for one day in one locality.

TRYPHON FLAVIFRONS, N. S.

BY REV. THOMAS W. FYLES, F. L. S., SOUTH QUEBEC.

Antennæ, filiform, brown; number of joints, twenty-seven; scape, large, ovate, pale yellow beneath. Eyes naked, large and prominent, dark rosy brown. Clypeus, labrum, mandibles and palpi pale yellow. The lower portions of the epicranium are of the same colour. The occiput is black, smooth and glossy. Mesothorax highly convex, black, sparsely set with short, pale-brown, retrorse hairs. Scutellum elevated. Tegulæ yellow. The under parts of thorax amber-coloured, as are also the legs, with the exception of the tarsi and parts of the tibiæ of the hindmost pair, which are brown.

Wings hyaline. Costal and sub-costal nervures coalesce; stigma large; basal nervure much curved inwardly; the second transverse cubital nervure wanting; third submarginal cell large; second transverse cubital nervure short and straight; recurrent nerves straight and parallel; second discoidal cell rather small.

Abdomen long, flattened, sessile, black above, yellow beneath. Ovipositor black, short and straight, the case set with black bristles beneath.

Length of body, three-tenths of an inch, and of antennæ two-tenths. Expanse of wings, four-tenths. The fly makes its appearance in August.

Described from six specimens obtained from Nematus larvæ that had fed on a species of poplar *(P. nolesti)* imported from Russia, and that had gone into cocoon.

Digitized by Google

THE SONG OF THYREONOTUS.

BY WILLIAM T. DAVIS, STATEN ISLAND, N. Y.

Mr. Samuel H. Scudder, in the Report of the Ontario Entomological Society for 1892, gives an interesting account of the "Songs of Our Grasshoppers and Crickets," and kindly permits the stridulations of a number of Staten Island insects to be heard mid the general medley. There is, however, an additional songster to be added to this list, as appears from the following.

On the 26th of last June I heard in a moist pasture, on the north shore of the Island, a stridulation that was unknown to me. It much resembled that produced by *Orchelimum vulgare*, with the preliminary zip, zip, omitted. It was a continuous *z e e e*, with an occasional short *ik*, caused by the insect getting its wing-covers ready for action after a period of silence. It was too early for *Orchelimum vulgare* by about a week; at least I have never heard one on the Island before the fourth of July; so in the present instance I made careful search for the musician. In due time I discovered, in a tussock of rank swamp grass, the brown songster perched on a dead leaf, and receiving the evidently welcome rays from the afternoon sun. It was *Thyreonotus pachymerus*, and in the swampy field about me I heard others of its kind, so that this individual was only one of a considerable colony.

A failure to make proper use of his legs (the wings are abortive), resulted in the transfer of Thyreonotus from the tussock to a tin can. At home I made a bowery for him in a larger tin can covered with netting, into which was introduced a branch of the coriaceous leaved post oak, and when the leaves dried, there were innumerable nooks and crannies wherein to hide. Usually, however, the insect did not hide at all, but perched himself on one of the topmost leaves and there waved his antennæ after the manner of all long-horned Orthoptera. Starting with raspberries, he had the rest of the fruits in their season, including watermelon, of which he showed marked appreciation. If I offered him a raspberry, and then gradually drew it away, he would follow in the direction of the departing fruit and would finally eat it from my hand.

As the bowery was kept in my bed room, I had the full benefit of the songs of its occupant, and was often awakened in the night by his sudden, alarm-like outburst of melody. He stridulated with unabated zeal to the first of August, when I noticed that his energies were lagging—he

Digitized by Google

seemed to be much less sprightly. Finally his song, instead of filling the room, was but a faint sound, and I was obliged to place my ear close to the tin can. This was nearing the end, which came either on the tenth or eleventh of September, I cannot say which, for the bowery was not disturbed until its occupant had been missing from the upper leaves for several days.

Once or twice during his captivity he took unnecessary alarm at my well-meant efforts to "fix" the bowery, and whacked his head most insanely against the tin can, being propelled thereto by his muscular hind legs. However, no harm seemed to result from these little fits of nervousness, and he evidently died quietly enough in the end.

I have observed in other kinds of grasshoppers the subsidence in the volume of song as they grew older, which evidently makes it unsafe to take the efforts of a single individual as the standard of the species, especially if the time is late in the fall.

NOTES ON LEUCANIA PSEUDARGYRIA, GUEN.

BY REV. THOMAS W. FYLES, F. L. S., SOUTH QUEBEC.

Full-grown larva.—Length, two inches. Colour greenish-brown above, greenish-grey beneath. Pale dorsal and side lines. Spiracles black. Head and scale on second segment light reddish-brown; jaws darker brown. This description agrees with that given by Mr. Caulfield in Vol. XIII. of the CANADIAN ENTOMOLOGIST, page 132.

The larvæ, like those of *Arzama obliquata*, feed in the stems of *Typha latifolia*. The two species may sometimes be found in the same plant. They are plentiful in the swampy ground at the foot of Mount Royal, Montreal. Both sometimes become the prey of the maggots of *Chætopsis ænea*, Wied.

Pupa.—Length, one inch and a-quarter. Colour light brick-red. Forepart rounded abruptly and terminating in a beak-like projection, resembles the head of a bird. Thoracic portion of case curves backward on either side to a point. Wing cases large.

My specimens underwent the pupal change amongst the accumulated frass in their tunnels; but doubtless the larvæ sometimes leave the food-plant and seek hibernacula elsewhere, as do those of *Arzama obliquata*. (See Mr. Caulfield's notes referred to above.)

Digitized by Google

TWO NEW CYNIPIDS FROM WASHINGTON STATE.

BY C. P. GILLETTE, FORT COLLINS, COLO.

In February of last year I received a box of galls from Mr. Trevor Kincaid, of Olympia, Washington, for identification. The galls were taken from *Rubus Nutkanus*, and the flies reared from them early in the following March prove to be a new species, which I take pleasure in dedicating to Mr. Kincaid.

Diastrophus kincaidii, n. sp.

Gall.—Either of the two galls in my possession measure almost exactly 1¼ inches in length by three-fifths of an inch in greatest diameter, and are upon twigs that do not exceed 2½ mm. in diameter. The galls are abrupt enlargements of the twigs, and they are literally filled with larval cells. The portion of the gall-subtance lying outside the cells is quite pithy, but the portion forming the septa between the cells is hard and woody. The surface of the gall is smooth, but is irregularly swollen or lumpy, much as in the gall of *D. nebulosus*.

Gall-fly.—Female. Black; legs, dark rufous; length, 2 to 2½ mm.

Head: face, coarsely striated; frontal carina, smooth and shining and but little elevated (it seems like a ridge made by two depressed lines, one on either side) vertex, genæ and occiput smooth and shining; ocelli, inconspicuous; face, sparsely set with very fine pubescence; mandibles, somewhat rufous at base; antennæ, 13-jointed and black in colour. Thorax: mesonotum, nude, polished; parapsidal grooves distinct; median groove also distinct, but extending only a short distance from scutellum; prothorax, striate; mesothoracic pleuræ, shining, finely aciculate over a portion of the surface; scutellum rugose, bifoveate. Abdomen, entirely black; petiole, fluted, second segment occupying one-half of the dorsum. Wings, 3 mm. long; hyaline; 1st and 2nd transverse nervures, quite black, but not very heavy; areolet, small.

The male differs from the female in being only one and three-fourths mm. long, having antennæ 14-jointed, and having the abdomen smaller.

Described from 25 females and 14 males bred from the galls.

Synergus garryana, n. sp.

Female. General colour rufous, with tips of mandibles, compound eyes, vertex between ocelli, occiput, lower half of mesopleuræ, metathorax, pedicel of abdomen and two blotches on second abdominal segment, one next the petiole and one just beyond the middle of the dorsum, black.

Digitized by Google

Head; face entirely yellowish-rufous, coarsely striated and sparsely set with short hairs; vertex rugose-punctate; antennæ 14-jointed, and in colour like the face, a little infuscate at the tip. Thorax above a little darker rufous than the face, transversely rugose; parapsidal grooves narrow and rather indistinct, but extending to the collar; no median groove; parallel lines extending back from the collar, short and rather indistinct, sparsely set with short recumbent hairs; scutellum coarsely rugose, the foveæ oblique and shining black at the bottom; mesothoracic pleuræ coarsely aciculate; in two specimens the lower half only is black, and in two others, a little smaller, the entire pleuræ are black. Abdomen: petiole coarsely striated; second segment very smooth and shining, and finely punctured on outer third. Legs, including coxæ, uniform light yellow, except the tarsi of the third pair and the tips of the last tarsus in the others, which are black. Wings hyaline, nervures light, areolet obsolete. Length, 2½ to 3 mm.

Male. The male differs from the female as follows: Length, 2¼ mm.; vertex above antennæ, except a narrow orbital line, black; antennæ, 15-jointed; thorax, entirely black; abdomen, black, except the tip of the second segment, which is yellowish, and the entire tibiæ of the pair of legs are blackish.

The above descriptions are made from four females and five males which issued from the galls between March 1st and 10th, 1893.

The galls from which this very pretty Synergus was reared resemble very closely those of *Holcaspis monticola*, Gill, MS., the description of which is already in the hands of the printer for publication. The galls were collected by Mr. Trevor Kincaid, of Olympia, Washington, from twigs of *Quercus garryana*.

WHICH SIDE OF THE TREE DOES PHLŒOTRIBUS LIMINARIS ATTACK?

BY F. M. WEBSTER.

Recently, while studying the habits of this beetle in the peach orchards of Catawba Island, on the south shore of Lake Erie, I was surprised to observe that the fall attack had invariably been made on the east or south-east side—which is here the land side of the trees—and old trees, where the bark of the trunks was very rough, were more seriously affected. On mentioning the fact of this apparent discrimination in point of attack to my friend Dr. D. S. Kellicott, he recalled that the same phenomenon occurred about Buffalo, New York.

Digitized by Google

Here in Ohio, in every case where the writer has observed it, the adults only have been found, wintering in burrows or chambers in the bark clearly excavated by themselves after becoming fully developed and not during larval stage.

On February 10, I took from a peach tree in Eastern Arkansas, adults, pupæ and what I presumed to be larvæ of this species, from all sides of the tree, which, by the way, was rather a young one with bark comparatively little roughened. This tree stood just above high water mark, on the eastern foot of Crawley's Ridge, which marks the western boundary of the swamp or overflowed country to the west of the Mississippi River. There was here, certainly, no partiality shown for any particular side of the tree. Are the beetles in Northern Ohio and Western New York driven to the discrimination previously noted by the lake winds, at the time they burrow into the bark in the fall, and has such selection in point of attack been observed elsewhere, except near and to the south of the Great Lakes?

CORRESPONDENCE.

TRYPETA, CLISIOCAMPA AND AMMALO.

The January and February numbers of the CANADIAN ENTOMOLOGIST just to hand suggest a few remarks. Prof. Townsend gives a most interesting account of the *Bigelovia* Trypetid, and although I had described the imago as well as the gall in Ent. Mo. Mag. (Dec., 1890, p. 324), most of what he writes is new. The eyes, as Prof. Townsend surmises, are green in life. The variety from Johnson's Basin seems to have the character of my var. *disrupta*. The hymenopterous parasite mentioned on page 52 may perhaps be a *Torymus*, identical with one I bred at West Cliff. I also bred from the galls a new *Eurytoma* (*E. bigeloviæ*, Ashm.) and a weevil, *Anthonomus canus*, besides the Cecid, which I described as *Cecidomyia bigeloviæ*. At West Cliff, Colo., a *Clisiocampa* is very common, which, according to Mr. Dyar, must be referred to *C. fragilis*, Stretch. I had always called it *californica*, following Dr. Packard's opinion. An account of this insect will be found in the 4th Rept. of the Colo. Biol. Assoc., where the distinctness of certain of the larvæ from *californica* is alluded to. *Populus* and *Salix* may be added to the list of food-plants. I also found larvæ on *Ribes aureum*. I found the eggs on willow branches in batches; colour pale greyish, shape elongate, eggshells iridescent within. *Ammophila robusta* is an enemy of the larva, but I did not notice any parasites. On page 27 Mr. Dyar refers to *Ammalo helops*. This gets nearer to the U. S. than Surinam, at all events, since Möschler in 1886 recorded it from Jamaica. With reference to the foot note on page 52, it is only fair to state that the trypetid nature of the *Bigelovia* galls was first discovered at the Department of Agriculture, Washington. This was before I had bred the imago.

Feb. 19, 1893. T. D. A. COCKERELL.

Mailed April 11th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, MAY, 1893. No. 5.

NEW SPECIES OF FOSSORIAL HYMENOPTERA.

BY WM. J. FOX, PHILADELPHIA.

MYZINE THORACICA.

♀.—Clypeus strongly and closely punctured, carinated or angular down the middle; front with large, coarse punctures, which become sparser on the vertex and cheeks; the ocelli deeply pitted, the hind pair almost hidden; prothorax, mesopleuræ, dorsulum and scutellum with large, separated punctures, those on the dorsulum by far the largest and sparest; metathorax above and behind entirely smooth, the metapleuræ with oblique striations; legs, especially the tibiæ, coarsely punctured, the outer side of the medial and hind tibiæ covered with strong, short bristles, and in addition with a row of stout, short spines on the outer edge, the medial and hind tarsi with long bristles and spines; anterior tarsi with the spines stout, the longest equalling the length of the first joint of that tarsus; wings flavo-hyaline, somewhat fuscous apically, the nervures testaceous; abdomen with a beautiful iridescent sheen dorsally, with fine rather close punctures, the first segment and base of the following three impunctate; on the apical portion of segments 1–3 the punctures are sparse and stronger, those on the fifth segment stronger; ventral segments on apical portion with large punctures or holes, which form on segments 1–4 a transverse row, which is produced forward into an angle medially; last dorsal segment with fine longitudinal striations. Black: mandibles, except apical portion, apex of scape, base of femora beneath, apex of fore tibiæ, the remaining tibiæ above and the tarsi. Rufous: a spot at the extreme side of clypeus, a transverse mark on front behind antennæ, interrupted medially, which extends up along the inner orbits and coalesces with the mark on the vertex—this latter extends down on the cheeks; prothorax above, except two elongate, transverse marks, two large spots on mesopleuræ, middle and outer lobes of the dorsulum in part, tegulæ, scutellum, post scutellum, a large spot in middle of metanotum, a much larger one on each side of the posterior face, which extends around on the sides; the

Digitized by Google

femora and tibiæ in part, a transverse band on dorsal segments 1–5 of abdomen, all of which except the first are narrowed medially, the first and second slightly separated, that on the third segment somewhat squarely emarginate behind, and ventral segments 2–4 with a large spot, those on the second segment longitudinal, the others transverse; mandibles and labrum fringed with testaceous hairs; head, thorax, legs and abdomen beneath with long, pale hair. Length, 18–20 mm.

So. Illinois *(Chas. Robertson)*. One specimen has the markings on the abdomen narrower, the band on the second segment widely divided in the middle, the third ventral segment immaculate, and the front with a longitudinal medial yellow line. Allied to *sexcincta* and *caroliniana*. From the first mentioned it is distinguished by the entirely smooth metathorax, the richer livery; from the latter by the stronger and closer punctuation of the front and ventral portion of the abdomen and larger size. It may, however, prove to be but a variety of *sexcincta*.

POMPILUS RELATIVUS.

♀.—Anterior margin of clypeus distinctly but not strongly incurved; ront with the impressed line obliterated in the middle, but very strong behind the antennæ and before the ocelli; posterior margin of prothorax subangular: metathorax rounded behind, upper surface with a rather strong, longitudinal, impressed line, which terminates at base of posterior face, the latter depressed; tibiæ and tarsi strongly spinose; tarsal claws toothed at the base; longest spur of hind tibiæ more than half as long as the first joint of hind tarsi; wings deep blackish violaceous, the apical margins even darker, third submarginal cell triangular, the second and third cubital transverse veins very contiguous at the top, second recurrent nervure sinuous, received by the third submarginal cell at about the middle; ventral abdominal segments with a few erect hairs, which are most dense and prominent on apical segment. Black, with a very slight bluish reflection, which is most obvious on the abdomen; legs and antennæ entirely black; head and anterior coxæ with numerous long, black hairs, the prothorax and dorsulum also with a very few hairs. Length, 18 mm.

Two specimens. Ocean County, N.J. *(Prof. J. B. Smith)*; So. Illinois *(Chas. Robertson)*. Related to *philadelphicus*, *æthiops* and *maurus*. The clypeus is much less incurved than in either of the first

Digitized by Google

two species, and the third submarginal cell differently shaped. From *maurus* it differs by having the tarsal claws toothed, instead of cleft. Its position is between *æthiops* and *maurus*.

POMPILUS POSTERUS.

♀.—Anterior margin of clypeus very slightly incurved; frontal impression distinct; posterior margin of prothorax bowed; metathorax not impressed above; tibiæ and tarsi very strongly spinose, the longest of those on the fore tarsi almost equalling the first joint of that tarsus in length; tarsal claws cleft; longest spur of hind tibiæ much more than two-thirds as long as the first joint of hind tarsi; wings hyaline, the apical margin broadly fuscous, nervures black; third submarginal cell narrowed about one half at the top, the second recurrent nervure received by it a little beyond the middle. Black: head, thorax, legs and first abdominal segment clothed with silvery pile which has somewhat the appearance of verdigris; hind femora and tibiæ (the spurs excepted) rufous, posterior margin of prothorax narrowly whitish; head with rather sparse, pale hair. Length, 7 mm.

♂.—More slender than the female, antennæ shorter and stouter; the tibial spurs, transverse band at base of third dorsal segment, and spot at apex of abdomen above, white. Length, 7 mm.

Camden County, N. J. (July); So. Florida (*Chas. Robertson*). Allied to *biguttatus*, from which it differs in the colour of the hind legs, the stronger armature of the legs and the greater length of the hind tibial spur.

PLANICEPS CALCARATUS.

♂.—Anterior margin of clypeus rounded; front strongly impressed on lower portion; anterior ocelli deeply pitted; antennæ reaching much beyond the tegulæ, the flagellum slightly tapering to the apex; hind margin of prothorax formed into a very slight angle medially; metathorax above with exceedingly fine punctures, with longitudinal, medial, impressed line; tibiæ with distinct, though not strong, spines, the tarsi scarcely or not at all spined; longest spur of hind tibiæ as long as the first joint of hind tarsi; wings sub-hyaline, iridescent, nervures fuscous, second recurrent nervure uniting with the second transverse cubital vein; black;

Digitized by Google

tibial spurs white; head and sides of thorax sparsely clothed with silvery-sericeous pile. Length, 6 mm.

So. Florida *(Chas. Robertson)*. Distinct from our only other known species, *feralis*, by the longer antennæ and hind tibial spurs, and by the white calcaria.

GORYTES DENTATUS.

♂.—Head not as broad as the thorax; ocellar region slightly raised, the ocelli forming a very low triangle; front with large, shallow, scattered punctures, the longitudinal impressed line strong; inner eye-margins slightly though distinctly converging towards the clypeus; scape but little if anything longer than the clypeus, is long in the middle, third antennal joint distinctly longer than any of the following, except the last, to which it is about equal; joints 10–12 emarginate beneath, the twelfth joint but slightly so; clypeus convex, with a few scattered, indistinct punctures, its anterior margin distinctly incurved. Thorax with strong, separated punctures, sparsest on the scutellum; in addition to the carina which runs from each shoulder tubercle around the fore edge of meso-sternum, there is behind it a transverse carina or ridge, which terminates in a stout tooth at the extreme side; enclosed space on metanotum well-marked, triangular, its sides somewhat incurved, on the basal portion it is longitudinally strongly striated, while on the apical narrow portion it is transversely striated, at the apex of the enclosure there is a strong pit; four posterior tibiæ and tarsi tolerably well furnished with spines; wings hyaline, a fuscous cloud completely fills the marginal, second and third submarginal, and the apical portion of the third discoidal cells; there is also a slight spot at apex of median and sub-median cells, stigma and costal nervure fulvous, the other nervures black. Abdomen with tolerably strong, separated punctures, strongest and more scattered ventrally, first segment at apex nearly as wide as the second, sessile with it, the second segment transversely swollen near the base, so that when viewed from the side the first and second segments are separated by a deep suture. Entirely bright ferruginous; tips of mandibles black; clypeus, front and face on sides, scape beneath, transverse line on collar, shoulder-tubercles, anterior portion of mesopleuræ, scutellum, a spot on four anterior tibiæ in front, first joint of medial tarsi at base, and apical margins of dorsal abdominal segments 1–3, pale yellow; the fascia on segments 2 and 3 narrowest

Digitized by Google

broadened at extreme sides; a broad fascia on second ventral segment and two large spots on the third, also yellowish; clypeus sparsely clothed with pale hairs. Length, 10 mm.

Grand Canon, Arizona, "70 miles North of Flagstaff." *(C. H. Tyler Townsend).* Not closely related to any of our species. It comes nearest to *G. spilopterus* and *tricolor*, but the sculpture is finer and the abdomen differently shaped. It differs from the ♂ of *tricolor* in the dentate mesosternum; the ♂ of *spilopterus* is as yet unknown, but *dentatus* differs too greatly to consider it the ♂ of that species.

MIMESA MACULIPES.

♂.—Anterior margin of clypeus subtruncate, entire; front with very fine, close punctures, which become sparse on the vertex, and strongly impressed medially; ocelli very prominent, placed in a triangle, on each side of the hind pair there is a strong depression; antennæ rather long, the flagellum clavate; first joint of flagellum about one-quarter longer than the second; dorsulum with very fine punctures, almost impunctate; suture between dorsulum and scutellum wide; scutellum impunctate, slightly impressed medially; metathorax very strongly rugose; the enclosed space at base of metanotum with numerous, somewhat oblique ridges; petiole in length distinctly shorter than the hind femora, almost straight, the upper surface with two widely separated furrows, on the sides the petiole is broadly channelled; remainder of abdomen impunctate, last dorsal segment smooth; black, the abdomen entirely so; flagellum beneath rufous; apex of four anterior femora, the tibiæ and tarsi, pale testaceous; hind tibiæ, except base and apex, black; face and clypeus with bright silvery pubescence, wings hyaline, nervures and stigma black. Length, 10 mm.

So. Florida *(Chas. Robertson).* Because of both recurrent nervures received by the second submarginal cell, I have placed this in *Mimesa.* It differs from all our species of that genus (?) by the entirely black abdomen. In my opinion *Mimesa* is but a section of *Psen.*

Digitized by Google

SYNOPSIS OF THE ASILID GENERA MALLOPHORA AND NICOCLES.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

With the exceptions of *Mallophora ardens*, Macq., and *M. fulviventris*, Macq., neither of which have been identified, the following table contains all the species belonging to this genus at present known to occur in America north of Mexico. Three species are known to me to inhabit Southern California: *fautrix*, O. S., originally described from Mexico; *Guildiana*, also found in Montana, Kansas and North Carolina; and a new species described below:—

1. Pile of abdomen light coloured, none black 2
   Pile of abdomen light coloured, many on the fourth or following segments black 5
   Pile of abdomen wholly black ..... *nigra*, Will.
2. Femora, except the extreme apex, black 3
   Femora largely or wholly red 4
3. Thorax destitute of black pile, first posterior cell broadly open ..... *megachile*, n. sp.
   Thorax with black pile, first posterior cell closed .. *clausicella*, Macq.
4. Femora wholly red, pile of legs largely black ..... *fautrix*, O. S.
   Femora marked with a distinct black spot on each, pile of legs light yellow ..... *Guildiana*, Will.
5. Pile of venter light coloured 6
   Pile of venter black ..... *orcina*, Wied.
6. Species not exceeding 15 mm. in length ..... *laphroides*, Wied.
   Species exceeding 20 mm. in length ..... *bomboides*, Wied.

Mallophora megachile, n. sp., ♂ ♀. Black, tibiæ and extreme apices of the four anterior femora yellow. Pile of entire body grayish-white, more yellow on the tibiæ, a few black ones on the antennæ, front, tips of posterior femora above, and many on apices of the posterior tibiæ and on all the tarsi; that on the hypopygium of the male rather dense, white, appressed and parted in the middle. A few black bristles at apex of each of the four posterior femora above, also on the under side of the posterior femora and on the posterior tibiæ. Halteres brown. Wings grayish-hyaline, costal and marginal cells darker; first posterior cell broadly open; apices of the fourth and of the three following veins nearly colourless. Antennal style less than three-fourths as long as the third joint.

Digitized by Google

Length, 12 mm. Los Angeles County, Cal. Four males and one female.

The following table contains all the species of *Nicocles* known to occur in America north of Mexico; of these, *rufus* and *scitulus* may belong to *Blacodes*:—

1. Third and fourth abdominal segments wholly black.....3
   Third and fourth segments largely or wholly red.....2
2. Body red, a black spot on the second abdominal segment.....*rufus*, Will.
   Body black, abdominal segments three to six largely red.....*abdominalis*, Will.
3. Wings hyaline, a brown cloud at base of each submarginal, posterior and of the discal cell.....*scitulus*, Will.
   Wings marked with brown in other places than these.....4
4. Antennal style one-half as long as the third joint.....5
   Antennal style only one-fourth as long as the slender third joint; eastern species.....*pictus*, Lw.
5. Fifth abdominal segment in the male more than three times as wide as long.....6
   Fifth segment less than three times as wide as long; California species.....7
6. Inhabits the Atlantic States.....*politus*, Say.
   Inhabits California.....*dives*, Lw.
7. Brown spot at tip of wing not crossing the first and second posterior cells; posterior tibiæ and tarsi of the male densely silvery within.....*argentatus*, n. sp.
   Brown spot at tip of wing crosses the first and second posterior cells; posterior tibiæ and tarsi of the male not silvery.....*æmulator*, Lw.

Nicocles argentatus, n. sp., ♂. Black, the tibiæ and apex of the sixth and sometimes of the fifth abdominal segment red. Front grayish-brown pollinose, face nearly flat, white pollinose and sparse whitish pilose, mystax on oral margin consisting of a few long yellowish hairs interspersed among about fourteen stout yellow bristles; pile of palpi and of occiput white, bristles of the latter yellowish. First joint of antennæ

Digitized by Google

slightly longer than the second, the third one and three-fourth times as long as the first two taken together, of nearly an equal width, the style nearly half as long as the third joint. Thorax marked with a broad median black stripe not extending on the posterior fourth, and on each side of it is a large brown pollinose spot divided by the suture and bounded in front by a black spot, also a brown spot on the humeri, elsewhere the pollen is grayish-white, the pile very sparse, white, the bristles brown; pleura brown pollinose in front, grayish-white pollinose behind, the fan-like row of hairs in front of the halteres white. Scutellum brown pollinose, a black spot at the base each side; bearing two brown bristles. Abdomen smooth, sparse grayish-black pollinose, that at base and sides of segments two to four gray, the fifth and sixth segments wholly silvery pollinose; second segment longer than wide, the others wider than long, the fifth being two and a-half times as wide as long; venter gray pollinose and with a median brown pollinose stripe, its pile and that of the legs white, the bristles of the latter white and yellowish; posterior tibiæ within, and the underside of their tarsi, densely silvery-white pollinose and pubescent. Wings hyaline, an indefinite pale brown spot extends from the tip of the auxiliary vein to the base of the fifth posterior cell, darkest in the marginal and interrupted in the first submarginal cell; a second brown spot covers the veins at bases of the first, second and third posterior cells; a scarcely apparent brown spot at base of second submarginal cell, and a large one filling apices of the marginal, first and second submarginal and of the first posterior cell, extending from one-half to three-fourths the distance from the tip to the base of the second submarginal cell, and sometimes connected with the first mentioned brown spot by a brown streak extending through the middle of the marginal cell; all posterior cells open, the anal cell closed.

♀.—Same as the ♂, except that the apices of the fifth and sixth abdominal segments are never red, the pollen covering these segments is never silvery, and the posterior tibiæ and tarsi are destitute of silvery pollen and pubescence.

Length, 8 to 10 mm. Los Angeles and San Bernardino Counties, Cal. Nine males and eight females in April.

Digitized by Google

DESCRIPTIONS OF CERTAIN NEW FORMS OF LEPIDOPTERA.

BY B. NEUMOEGEN AND HARRISON G. DYAR.

Family LAGOIDÆ.

Vein 1a of primaries present; median, 4-branched; vein 8 of secondaries arising from the subcostal, more than half the length of cell from base; ♂ antennæ pectinated to the tip.

Synopsis of genera :—

Antennæ long; body parts robust.

Veins 3 and 4 of secondaries stalked.. ..... *Carama.*

Veins 3 and 4 separate, arising from the median..... *Lagoa.*

Antennæ very short; body more slender..... *Dalcerides.*

Genus DALCERIDES, *n. gen.*

Head very small, but with large eyes; palpi slender, antennæ *very* short, hardly as long as the thorax, finely bipectinated. Vein 1 of primaries free, unbranched; 1a present; median vein 4-branched, vein 2 arising beyond the middle, veins 3–5 from near together; cell broad, closed, with false discal vein; 6 from the middle of the retracted upper half of the cross vein, a small rounded accessory cell; 7–8 on a stalk from the pointed end of the accessory cell; 9 from the same point; 10 apparently absent; 11 from top of accessory cell, appearing to join 12, which is free from base. The secondaries have two internal veins; veins 2–6 as on primaries; 7 a continuation of the subcostal; 8 from subcostal on middle of cell, not diverging till end of cell; a discal false vein runs to the angulation of the cross vein between the origins of veins 5 and 6.

Type, *Artaxa ingenita*, Hy. Edw.

Family NOTODONTIDÆ.

Median vein of primaries 3-branched; 8 of secondaries from base, close to subcostal for a large part of its length; veins 3 and 4 not stalked.

Partial synopsis of genera :—

Outer margin of primaries entire.

♂ Antennæ pectinated to the tip, the pectinations as long or longer than their cilia.

Primaries without accessory cell.

Internal margin entire.

Vein 5 of secondaries weak or absent.

Tip of abdomen with a brush-like tuft... *Melalopha.*

Digitized by Google

Genus MELALOPHA, Hübn (= *Ichthyura*, Hübn.)

M. ALETHE, *n. sp.*

We have before us a ♀ specimen from Truckee, California, which seems to be undescribed. It is possible that we have to do with *M. apicalis*, though the description of Walker does not fit. It is allied to *M. multnoma*, Dyar, and *M. brucei*, Hy. Edw.

Colour, obscure gray or drab, with the usual deep brown thoracic mark. Fore wings slightly purplish ("ecru drab," Ridgway's nomenclature of colours, plate III., fig. 21), the lines as in *brucei* and *multnoma*, but white and narrower, more as in *pigra*, powdery, obsolescent, under the lens narrowly broken here and there, the fourth forming a distinct, somewhat S-shaped bend at costa, where it is slightly widened and distinctly white. The wing is very uniform in colour, without the contrasting shades of *brucei* and *multnoma*; there is no subapical rusty patch except the merest trace outside the 4th line, but a moderately distinct deep brown shade overspreads the whole apical portion of the wing from the third line outward, reaching downward to vein 3, and being most strongly marked in the region of the 4th line. It recalls the ornamentation of *M. anachoreta*, Fabr.; but is far from being as distinct as in that species. This shading is present in *M. var. ornata* and *M. brucei* and others, but these have also the shade bordering the 3rd line, so that the resemblance to *anachoreta* is obscured. Subterminal series of interspaceal dots nearly straight, very uniform, and not obscured by the shading.

Hind wings drab (Ridgway, plate, III., fig. 18), immaculate. Expanse, 28 mm.

The following table will serve to separate the North American forms of Melalopha. Omitted names are referred to the synonymy :—

Lines not anastomosing, the 3rd running free from internal margin to costa.

Only the 4th line present (?)..... .*apicalis*, Walk.
Lines all present.
Size large, basal line straight.
Colour dark, with black subapical patch. *albosigma*, Fitch.
Colour paler, patch brown..... *var. specifica*, Dyar.
Size smaller, basal line angulated and curved.
Of uniform tint, subapical rusty patch very obscure..... *alethe*, Neum. and Dyar.

Digitized by Google

Of contrasting shades with distinct subapical rusty patch.
Colour very dark, obscured.....*multnoma*, Dyar.
Colour pale, shades contrasted....*brucei*, Hy. Edw.

Lines anastomosing, the 2nd and 3rd joining at or about the median vein.

Lines all waved, the basal one both angulated and curved.
Size medium, ornamentation distinct.
Size moderate with the usual thoracic patch.
Colour dark, a waved paler band on secondaries.
Subapical shade rusty red.....*vau*. Fitch.
Subapical shade brownish-red.*var. ornata*,G.&R.
Colour pale, line on secondaries lost.
Of a pale purplish shade....*var. bifiria*, H. E.
Pale, almost "sordid white"...*var. astoriæ*,H. E.
Larger, thoracic patch absent.....*inornata*, Neum.
Size small, longitudinal streaks more or less evident.
An obscure thoracic mark.....*strigosa*, Grt.
Without any thoracic mark.....*var. luculenta*, H. E.

Lines comparatively rigid, the basal dislocated on median vein, not toothed.
4th line white on costa.
Subapical patch distinct, yellowish, divided by the veins.....*inclusa*, Hüb.
Subapical patch darker, obscured.....*var. inversa*, Pack.
4th line not white on costa.....*jocosa*, Hy. Edw.

Family SATURNIIDÆ.

Median vein of primaries 3-branched, 8 of secondaries curved, free from base, and remote from subcostal; ♂ antennæ pectinated to the tip, often doubly bipectinated; secondaries with one or two internal veins; size large to very large. Genus AUTOMERIS, Hübn (= ||*Hyperchiria* p., Walk).

A. Io Fabr., *var.* ARGUS, *n. var.*

♂.—Head, thorax, body, legs and wings light yellow. Both wings uniform in colour, with some darker basal tints. On secondaries a prominent blackish-blue ocellus with white central lunule, surrounded by an outer semi-circular black line.

Below a large black discal spot, with white central kernel on primaries, and faint traces of the transverse lines on both wings.

Digitized by Google

This aberration, which seems extremely rare, is immediately recognized by its immaculate wings, showing only the large ocellus on secondaries.

Caught at Hoboken, N. J.

Family LITHOSIIDÆ.

Genus HYPOPREPIA, Hübn.

H. MINIATA, Kirby, *var.* SUBORNATA, n. var.

♂.—The red colour of thorax, body and primaries of a lighter shade than in the typical form. The black coating on upper surface of abdomen entirely wanting.

Secondaries immaculate, light rose colour, fading towards anal margin, with a faint grayish, apical tinge.

A striking variation, easily determined by the delicate shade of its immaculate secondaries.

Habitat: Texas.

We do not regard *H. miniata* as a synonym or variety of *H. fucosa*, Hübn, but as a valid species. The following table will serve to distinguish the described forms:—

Wings brightly coloured, with three longitudinal mouse-gray bands.
Ground colour of primaries entirely red.
Hind wings with broad mouse-gray border....*miniata*, Kby.
This border lacking.....*var. subornata*, N. and D.
Ground colour partly yellow, partly red.
Bands on primaries normal.....*fucosa*, Hübn.
Bands extensive, predominating and largely obscuring the ground colour.....*var. plumbea*, Hy. Ed.
Ground colour entirely yellowish.....*cadaverosa*, Strk.
Wings obscure gray, thinly scaled, the secondaries pink. *inculta*, Hy. Edw.

Family HEPIALIDÆ.

Genus STHENOPIS, Pack.

S. ARGENTEOMACULATUS, Har., *var.* SEMIAURATUS, *n. var.*

Antennæ light brown. Head, thorax and body, bright salmon colour. Legs pink, tufted with yellowish hair. Ground colour of primaries pinkish salmon. All the maculations, transverse bands, as well as the subterminal space, of a peculiar brownish yellow, which in

Digitized by Google

fresh specimens has the lustre of pale gold. The two silver dots near origin of cell, in primaries, prominent, varying in shape from subovate to subtriangular.

Secondaries light pink, fading into salmon-coloured tinges along anal margin and in basal area.

Wings below pinkish, veins prominently so, fading into lighter shades in basal areas. Pink subterminal lines.

Habitat: White Mountains of New Hampshire.

This well-known form has never really been described. It figured for decades in collections as *Sth. var. quadriguttatus*, Gr., which latter name, however, is a synonym of the typical insect. The type form, as a generality, is not as large as this variety, of which some specimens measure as much as 85.–90. mm. in expanse.

Described from several examples of both sexes.

HEPIALUS ROSEICAPUT, *nov. sp.*

One ♂. Antennæ light brown.

Front of head and palpi pinkish. Interspace between antennæ red. Prothorax, thorax, body, legs and wings of luteous stone colour.

Primaries with minimal granules of the very faintest pink. Two lines of irregular, blackish dots. One from base along median vein to near centre of cell, where it turns down to internal margin, meeting an oblique transverse line of dots from apex. Subterminal line blackish.

Secondaries blackish gray with luteous fringes.

Below, both wings blackish gray, with luteous costa and fringes. Legs with an outside tinge of pink. A slight anal tuft of the faintest pink.

Expanse of wings: 33 mm.

Length of body: 6 mm.

Habitat: Cascade Range near Lytton, British Columbia.

This insect belongs to the group of small sized, dull coloured Hepialidæ of our western continent. The peculiarity of the pinkish tint of the palpi and parts of the head makes it easily recognizable.

The types of all the new forms here described are in Mr. Neumoegen's collection.

UNIDENTIFIED NAMES.

In going over the literature of the North American Bombyces, we have been unable to apply the following names. A number of them are types of genera of which the original descriptions are inadequate. In-

Digitized by Google

formation respecting any of them will be most welcome, especially structural notes, to supplement the imperfect descriptions of the authors :–

Pseudalypia Crotchii, Hy. Edw.
Erruca Pertyi, H. S.
Thia extranea, Hy. Edw.
Earias obliquata, Hy. Edw.
Cisthene lactea, Str.
Alexicles aspersa, Grt.
Cingilia humeralis, Walk.
Limacodes (Semyra) Beutenmuelleri, Hy. Edw.
Limacodes (Tortricidia) ferrigera, Walk.
Kronæa minuta, Reak.
Dioptis megæra, Fabr.
Psyche fragmentella, Hy. Edw. (case only).
Psyche coniferella, Hy. Edw. "
Pseudopsyche (Oedonia) exigua, Hy. Edw.
Sapinella (Eutheca) mora, Grt.
Oiketicus Davidsonii, Hy. Edw. (case only).
Chalia Rileyi, Heyl.*
Brachionycha barometrica, Goossens.
Dasychira clandestina, Walk.
Ichthyura apicalis, Walk.
Gluphisia septentrionalis, Walk.
Notodonta plagiata, Walk.
Edema obliqua, Walk.
Edema plagiata, Walk.
Certila flexuosa, Walk.
Saligena personata, Walk.
Heterocampa thyatiroides, Walk.
" mollis, Walk.
" nigrosignata, Walk.
" umbrata, Walk.
Artace albicans, Walk.
Rhagonis bicolor, Walk.
Cossus nanus, Strk.

*This name is not included because we regard the description as inadequate, but because we do not know the species and have seen no reference to it in American literature.

Digitized by Google

NORTH AMERICAN THYSANURA.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Smynthurus spinatus, n. sp.

Olive. Head tinted with purple, lighter on the sides, olive around the mouth and eyes; coarsely and sparsely punctuate, punctures light olive, each bearing a white hair. Antennæ purplish, basal joint lighter, as long as the body; apical segment with from seventeen to twenty subsegments. Abdomen fuscous with lighter spots; the apical part with an olivaceous cloud, the remainder fuscous with whitish or olivaceous blotches; on the middle of the back a number of groups of circular white spots, and on the posterior part of each side a row of white spots, varying from four to ten. Underneath olive. Anal papillæ large, distinct, with numerous bristles; the upper part and the sides purplish or fuscous, the remainder olive with darker spots. Legs long and slender, purplish or fuscous, mottled with variously formed olive or whitish blotches; apex of the tibiæ and base of the larger claw blackish purple. Claws long and slender, inner claw indistinct; apex of the tibiæ with a few clubbed hairs. Spring long, broad and flat, reaching the mouth; second joint broad, each side with a row of long stiff bristles; bristles twice as long as the spring is broad; third joint long, broad, bluntly rounded.

Length, 2 mm. (.078 inch).

Habitat: Ithaca, New York.

A very variable species, in young specimens the back is pea-green, and in some specimens there is a broad olive band down the middle of the back. The color varies from pea-green to purplish and fuscous. Collected on the surface of standing water. The species can be easily recognized by the row of stiff hairs on each side of the spring.

Smynthurus floridanus, n. sp.

Black, sides lighter, hairy. Head black, with lighter lines, mouth olive. Antennæ long, slender, as long as the body, basal joint black, remainder olive. Thorax and abdomen with a triangular black spot, the base of the triangle at the apex of the thorax and its apex at the apex of the abdomen. Sides of the abdomen olive mottled with light brown. Underneath olive. Anal papillæ with its front and upper part black, the remainder olive mottled with brown. At the median two-thirds of the back, a stout porrect spine; spine as broad at base and higher than anal papillæ; concolorous with the black triangle, except a small olive spot on each side. Legs slender, pale olive; inner claw two-thirds the length of

Digitized by Google

outer, stout and blunt. Spring short, slender; third joint elongate with an apical and two smaller inner teeth.

Length, 1.5 mm. (.058 inch).

Habitat: Florida.

I am indebted to Mr. Nathan Banks for this unique specimen and species. Easily recognized by the abdominal spine, the stout inner claw, and the black dorsal triangle.

The only characters offered by Lubbock, in his Collembola and Thysanura, for separating *Smynthurus* and *Papirius*, is the form of the antennæ and the presence or absence of tracheæ. In my studies of these interesting insects I have found two other characters valuable in separating these genera. These differences may be stated as follows :—

Terminal segment of the antennæ long, ringed; larger claw unindentate; apical segment of the spring simple..... *Smynthurus.*

Terminal segment of the antennæ short, with a whorl of hairs; larger claw bidentate; apical segment of the spring serrate on the under side..... *Papirius.*

Anoura magna, n. sp.

Body short, broad, one-half as broad as long, finely granulated. Each segment with four dorsal and two lateral globular tubercles, except the last, which is deeply divided, having at its apex two immense globular tubercles. On the anterior part of the anterior margin of each segment another smaller tubercle. From each tubercle there arise from four to eight short, stiff, yellow bristles. On the dorsal part of the head the number of tubercles is the same, but the two median tubercles are placed on the caudal portion of a large quadrangular tubercle, which reaches from between the bases of the antennæ to the caudal part of the head. The ground colour is a light steel blue, with lighter spots between the darker tubercles. Antennæ very short, not reaching the lateral margin of the body by at least a quarter of its width, segments subequal, indistinctly marked. Eyes at the side of the base of the quadrangular tubercle, postantennal organs wanting. Buccal orifice blunt, short and white. Legs short, with a single strong claw.

Length, 5 mm. (.20 inch).

Habitat: Salineville, Ohio.

This species can be recognized by its size, colour, and the globular tubercles; from *gigantea* Tullb., its nearest ally, from Siberia, by the absence of the postantennal organ.

Digitized by Google

NOMOPHILA NOCTUELLA, SCHIFF.

ORDER LEPIDOPTERA. FAMILY PYRALIDINA.

BY E. P. FELT, CORNELL UNIVERSITY, ITHACA, N. Y.

This is one of the most common insects that flies throughout the summer months. It is also widely distributed; adults have been taken in widely separated parts of Europe, in Algeria, Caffraria, Bengal, Pondicherry, Brazil, and in the eastern and western parts of the United States. Packard writes of the species thus:—"Such cosmopolitan forms give rise to the suspicion that they are relics of a past geologic age, which is borne out by the fact that quite a gap separates it from its nearest allies." In spite of its wide distribution, this insect seems to be one of these common species that has escaped observation, very little having been published on its life history.

On the 15th of last September the writer found among the grass and clover in a pasture several pale greenish larvæ (Fig. 2, b) with black heads and numerous black tubercles. Upon being disturbed they quickly disappear, with a peculiar wriggling, jerking motion, under the grass; they seem to move with equal facility either backward or forward. When not feeding the larvæ can be found under a slight web in the centre of a clump of grass. Later observations show that the larvæ live almost wholly upon clover leaves, eating out the soft parenchyma and leaving the veins; they will eat grass if clover is not within reach, and one larva was observed to seize an Aphid and devour it, though there was plenty of food within reach. J. H. Leach in his "British Pyralids" gives *Polygonum aviculare* (knot grass) as the food-plant in Scotland. As the larvæ become full grown they may be seen wandering around and slowly assembling under chips, stones, etc., where they pupate; when in pastures, dried cow dung seems to be the favourite resort. On the 21st of September both larvæ and pupæ were abundant in these retreats; ten pupæ (Fig. 1, c, d) were taken from a piece of cow dung one-fourth the size of a man's hand. Before pupating the larvæ spin around them a thin, white, loose cocoon.

After remaining in the pupa state about ten days the insects emerge. The adults (Fig. 1, e) are of a sombre brown and a tawny yellow colour, with black markings. They have a peculiar jerky flight, and when disturbed they fly up suddenly about four feet, and usually alight within two rods of where they started. When at rest (Fig. 2, f) they are usually on a leaf with the wings folded flat over the back and the antennæ extend-

Digitized by Google

ing forwards. Within a few days after emerging the adults pair and oviposition begins. The eggs (Fig. 2, a) are not all laid at once, but are deposited in clusters of from three to ten or more, usually being laid side by side in a row. The period of oviposition probably extends over two weeks or more, as the adults can live seven weeks, though most of them die within a month. One female was dissected; she contained over eighty eggs, which is probably about the average. When first laid the egg-shell is quite soft and readily flattens upon contact with other eggs, or the leaf upon which it is laid, so that it is usually flattened upon several sides to a greater or less degree. At first the egg is a pearly white, but it gradually turns to a slate colour.

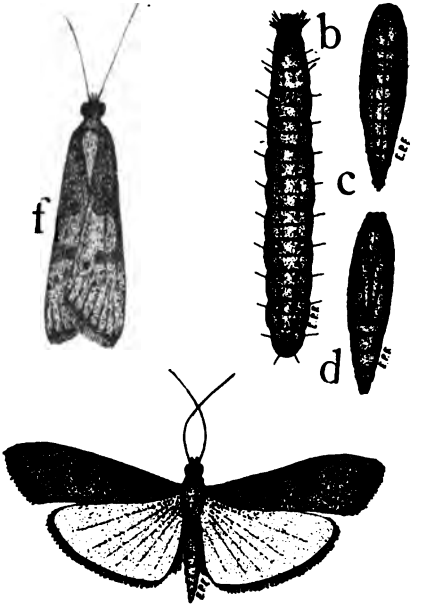


FIG. 1.

Nomophila noctuella: *b*, larva; *c*, pupa (dorsal aspect); *d*, pupa (ventral aspect); *e*, adult; *f*, adult (at rest). (All these figures are twice the natural size.)

The eggs hatch in about ten days, and the larva begins to feed upon the soft parenchyma of the leaf. The young larva has a brownish head and a straw coloured body, the tubercles are very small and the hairs longer proportionally than in the full grown larva. About a week after

Digitized by Google

hatching the larva moults; the skin ruptures between the head and the cervical shield and also splits a little ways along the back, and through this opening the larva crawls out of its old skin. Just after moulting the head and tubercles are a pale straw colour, later they become darker, and in the last stages of the larva they are almost black. The observed differences between the stages are a gradual increase in the size and depth of colouring of the tubercles, and a decrease in the relative length of the hairs. Before reaching its full growth the larva probably moults five times. In the fall, as the cold weather advances, the larvæ begin to spin nests in the axils of the leaves, where they retire when not feeding and in which grass is allowed to collect and around which the remains of partially devoured leaves are drawn, making a very complete hiding place. Later the nests in the axils of the leaves are deserted and similar nests are constructed upon the surface of the soil. These nests are lined with a thick layer of silk and are covered with a thick coating of particles of soil or bits of dried grass, making a thick, warm nest in which the larvæ pass the winter.

There seem to be three broods a year. In September of 1892 the simultaneous pupation of a large number of larvæ was very noticeable. The pupa state lasted about ten days, the adults emerged, eggs were laid and the larvæ moulted three or four times before cold weather forced them to retire for the winter. These hibernating larvæ come forth in the spring, complete their growth, pupate and the adults probably emerge in the first half of May. The second brood flies in the latter part of June, and the third brood, as already observed, flies the latter part of September. If the adult stage lasts four weeks or more, it would not be strange if the broods overlapped a little, especially the second and third broods, and this is borne out by a reliable record. During the year of 1889 the Entomological Department of the Agricultural Experiment Station, at Ithaca, N.Y., ran six trap lanterns from May 1 to October 20. *Nomophila noctuella* was picked out, the sexes determined and the results tabulated.

TIME OF FLIGHT OF NOMOPHILA NOCTUELLA, 1889.

	MAY.							JUNE.						JULY.													Totals.
Date.	5	6	7	8	11	19	20	3	5	16	28	30	1	6	11	15	18	19	20	21	24	25	26	27	31	
♂	1	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	3	3	2	5	40
♀	1																						2	1		4

Digitized by Google

	AUGUST.																	SEPTEMBER.									
Date.	1	2	3	4	5	6	7	9	15	16	17	18	21	23	24	25	26	29	4	6	8	18	19	21	25	29	30	Totals.
♂	2	3	1	3	4	0	2	3	1	1	1	0	1	1	2	1	1	1	2	1	1	0	1	0	1	1	1	36
♀					2	4		2	1			2										2	2	1			1	17

This table shows that the adults fly in greater or less numbers from May to the last of September. From May 20th to June 3rd none were taken, which pretty sharply defines the first brood. And, as might be expected, the second and third broods are separated by no such distinct line, and yet there is an indication of two later broods, though the table would seem to indicate that those taken in September might be the last of the second brood and not individuals of a third brood, which is contrary to observed facts. For during the last year a trap lantern was run with practically the same results as were obtained in 1889, but a third brood was observed to emerge in large numbers after September 20th. Probably the cool evenings prevented many moths from flying at night, and consequently from being taken in the trap lanterns.

Preventive Methods.—The above table shows that four-fifths of moths taken are males. If we assume that there are enough males left to fertilize the females, which is quite probable, the trap lanterns are almost useless as a means to check the increase of this insect, because the females escape, oviposit, and thus provide for the propagation of the species. As the larvæ and the adults incline to remain near one place, it is possible to materially reduce their numbers on limited areas. In large fields where plowing is not objectionable, many might be destroyed by thorough plowing in the latter part of November, after the larvæ have retired for the winter. Should this insect become very destructive in the summer, deep plowing in the middle of July, followed by harrowing, might destroy many pupæ. On lawns and other small areas advantage might be taken of the larva's habit of retiring under chips, etc., to pupate. If chips, etc., be placed on the lawn and firmly pressed down in the middle of July or of September, and allowed to remain a week and then collected and burned, many pupæ will be destroyed.

Technical Descriptions.

Egg (Fig. 2, a), pearly white when first laid, changing to a glistening slate colour within a few days. Shell finely reticulated; egg usually flattened upon several sides. Size, .69 mm. by .32 mm.

Larva (first stage), head diameter, .25 mm.; body, diameter, .15 mm.;

Digitized by Google

length, 1.05 mm. Clypeus, labrum and thoracic shield a tawny olive colour; head a seal brown; body a sordid straw colour. The tubercles proportionately smaller and the hairs longer than in the full grown larva.

Larva (Fig. 1, b), (last stage) length, 2 cm.; head, diameter, .32 mm. body, diameter, 3.7 mm. Head and thoracic shield black; scattering hairs occur on the head. Dorsal surface of body pale green with black tubercles. There are four tubercles on each side of the third and fourth segments, three in a row extending ventro cephalad and the fourth caudad of the last one in the row. The dorsum of the remaining segments i

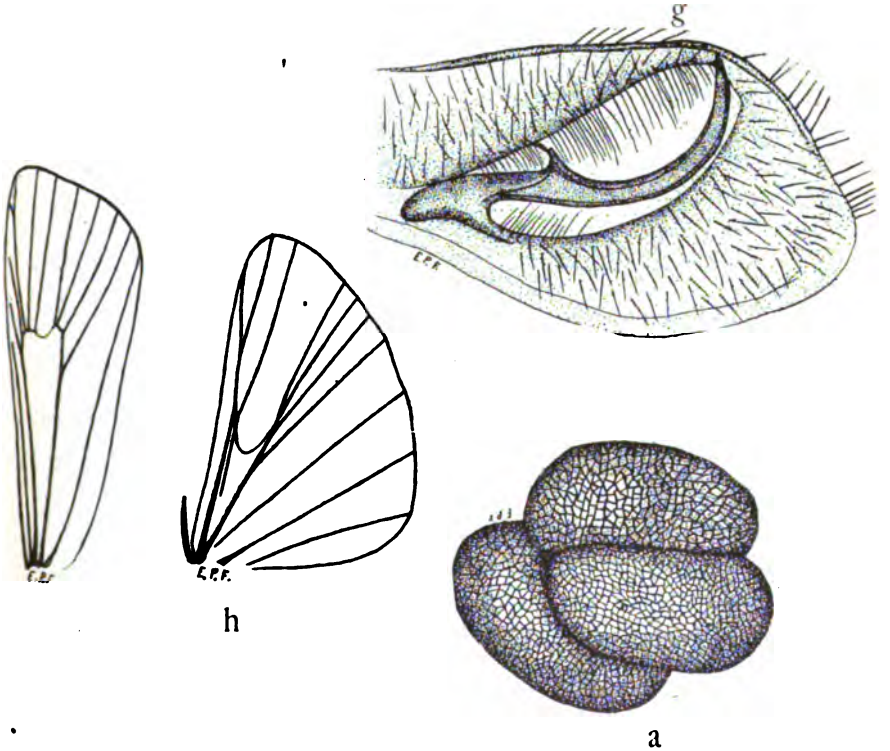


FIG. 2.

Nomophila noctuella: *a*, eggs, x 40; *g*, male genitalia (mesal aspect of right harpe and clasper), x 80; *h*, venation of wings, female, x 4.

divided by a slight transverse constriction into a cephalic and caudal part; the cephalic part of each segment bears three tubercles in a row, extending ventrad and forming with the tubercles of the third and fourth

Digitized by Google

segments a lateral, a super and a sub-stigmatal row of tubercles; the caudal part of each segment bears one tubercle, which is in the lateral row. The tubercles in the lateral rows on the thirteenth segment coalesce mesally. One or more hairs grow from each tubercle. Ventral surface sordid white with brownish tubercles. On the ventral surface there is a lateral row of brownish lunate tubercles, and on those segments not bearing legs there are transverse rows of four tubercles, those laterad being the larger. True legs brown with blackish tips. Five pairs of prolegs, occurring upon the seventh to the tenth and thirteenth segments inclusive. Prolegs short with brownish tips.

Pupa (Fig. 1, c, d), length 13 mm.; 3 mm. across the thorax. General colour light brown, venter lighter. Eyes prominent and usually dark coloured. The cephalic part of the pupal case is divided by sutures. Several of these unite at the base of the wing covers, where the chitine is thickened, darker coloured and pushed out into minute ear-like processes, which appear like dark spots. On the dorsum of the abdominal segments there are three dark stripes, extending from the thorax to the tip of the abdomen; one on the meson and the others, one on each side, just mesad of the spiracles. Abdominal sutures darker, darkest on the dorsum. Spiracles dark brown.

Adult (Fig. 1, e, f).

Male Genitalia.

Harpe (Fig. 2, g), membraneous; size 1.55 mm. by .81 mm.; mesal surface concave.

Clasper (Fig. 2, g), chitinous; fulvo-ferruginous; sickel-shaped.

Venation of wings (Fig. 2, h). Frenulum of ♂ a single spine, of ♀ two spines.

Bibliography:—1776, Schiffermiller, S. V. (Orig. Des.) Syst. Verz. Schmet. der Widner. (Schiff. & Dennis), Wien, p. 136; 1776. Herrich-Schäfer, Syst. Bearb. Schmet. von Europa, IV., p. 42; 1826, Duponchel, P. A. Hist. Nat. Lepid., VIII., 220–3; 1829, Treitschke, F. Schmet. von Europa, VII., 109; 1833, Wood, W., Index Ent., 1476; 1835, Treitschke, ibid, X., 23; 1854, Guenee, A. Delt. et Pyralites, 414, Paris; 1859, Heinemann, H. D., Schmet. Deut. und Schweig, 91; 1871, Staudinger-Wock, Cat., p. 212; 1872, Packard, A. S., Ann. Lyc. Nat. Hist., N.Y., X., p. 258–260; 1874, Berg, C. *(hybridalis)* Bol. Acad. nac. Ciencias Uni., Cordova; 1876, Snellen, P. C. T., Nat. Tijd. Neder., India; 1886, Leech, J. H, Brit. Pyralids, p. 21. Larva described and adult figured, Pl. VII., Fig. 2.)

Digitized by Google

FURTHER ON THE DIPTERA CONSIDERED AS THE HIGHEST INSECTS.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In my article in CANADIAN ENTOMOLOGIST, 1893, pp. 7-8, as also in my previous note in *Science*, Vol. XIX., 1882, p. 320, I stated that Hyatt and Arms were the first to point out that the Diptera were the most highly specialized insects, and consequently to be considered the highest in rank. It should be noted, however, that the same idea was advanced at the same time by the renowned insect anatomist, Mr. B. T. Lowne, well known for his work on the anatomy, etc., of the blow-fly. In part I. of this work, Oct., 1890, p. 25, Lowne says:—"The blow-flies belong to the family *Muscidæ*, one of the most highly specialized groups of the Diptera, the most highly specialized order of the class Insecta."

On pp. 26-7, he further says:—"Just as all discussion would be futile as to whether a bird or a mammal is the higher type, so it is useless to consider whether the Diptera or the Hymenoptera have the higher organization; but there can be no question as to which of these orders departs most from the more generalized form. The Diptera are far more remarkable in their developmental history, and in the modification of structure which they present in the adult or imago form. In this relation the strong tendency of many to produce their young alive, and the fact that some have a capacious matrix, or uterus, in which the larvæ are hatched, or even attain the pupa form, before birth, is not without interest, presenting as it does some analogy with the viviparous character of the mammalia amongst vertebrates—whilst the nest-building instincts are more manifest in Hymenoptera and in birds. [This is an important analogy, and well pointed out.—C. H. T. T.] It is true that the flies, and more especially the heavy forms, with a comparatively tardy flight, like the blow-fly, have been regarded as 'stupid'—Sprengel called them 'die dummen Fliegen'—and do not excite our sympathy and curiosity to the same extent as the social Hymenoptera; but it is impossible to judge of the intellectual functions of an insect. The manner in which the blow-flies and their near allies, the house-flies, have made themselves at home

Digitized by Google

with man, speaks for their power of adapting themselves to new and varied conditions. They are cunning, wary, and easily alarmed, and, except when benumbed with cold or heavy with eggs, know well how to avoid danger. They appear to me far more clever in this respect than the bees and wasps."

My article in the CAN. ENT. was written before I saw the above quoted passages in Lowne's work. In his first edition of the anatomy of the blow-fly (1870), Lowne does not advance any ideas with regard to the systematic position of the Diptera.

The real credit for the original discovery and correct interpretation of the extreme specialization of the Diptera belongs to Weismann, who published a paper upon the development of the Muscidæ,* in 1864. Later, in 1876, Ganin sustained in the main the investigations of Weismann. Lowne first presented these views in English, at least in the Old Country, while Hyatt and Arms were the first to call attention to them in America.

The consensus of facts bears out the statement that the Diptera are the most highly specialized, and therefore the most highly organized order of insects. While they possess ancient as well as recent forms, they have, in the muscid families, reached a higher plane of development than any group in any other order. It is by no means contended that the Nemocerous Diptera are as highly organized as some groups in other orders, since they comprise the most ancient living forms of Diptera.

The Diptera probably find their culmination in the Tachinidæ, and of this family doubtless the Phasiidæ stand first. *Trichopoda*, *Phasia*, and *Hyalomyia* may therefore be considered as probably representing the highest forms of insect life.

ROYAL SOCIETY OF CANADA.

The next annual meeting of the Royal Society of Canada will be held in the City of Ottawa, on the 23rd, 24th and 25th of May. The Society will be represented by Mr. Hague Harrington, our Vice-President. We notice by the programme that Mr. Harrington is to read a paper on Canadian Uroceridæ, a subject to which he has given much attention.

*Die nachembryonale Entwicklung der Musciden nach Beobachtungen an *Musca vomitoria* und *Sarcophaga carnaria*. Zeit. f. Wiss. Zool, XIV., 187 (1864).

Mailed May 18th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, JUNE, 1893. No. 6.

NOTES ON CHIONOBAS SUBHYALINA, CURTIS.

BY WM. H. EDWARDS, COALBURGH, WEST VA.

This species has long been lost sight of. It was described nearly sixty years ago from a single male "in good condition". I never have heard of its forming part of any collection excpet that of the British Museum, and my own, and my specimens—a male and a female—were sent me from the Museum more than twenty years ago. In his Catalogue of the Satyridæ, 1868, Mr. Butler says of this species: "We do not possess the type, but our specimens agree exactly with Mr. Curtis's description." Of my two specimens, the female was broken and the wings rubbed so that they were worthless for characterization, but the male is in fair condition. It does not agree with the description in some points. Thus, there are not "two indistinct white dots towards the apex with black ocelli"; and the surface of the under forewing cannot be called "mottled with ochre and pale black, lightest at apex", but the scales are abraded where the mottling should be. The description goes on: "inferior wings spotted and mottled with black and dirty white, forming a waved and curved pale line beyond the middle, with three or four whitish dots beyond it." My male has a slight and pale mesial band "waved" (or crenated) "and curved"; and if the dots beyond it may mean dots on the hind margin, the description will answer. The wings are described as semi-transparent, and this male is so to an unusual degree.

I have had for three years a single male taken by Mr. Bean at Laggan, which in some points agreed with the description of *Subhyalina*, but failed in others. There were no apical dots, no mesial band, and no whitish dots. Instead of the band there is a discoloration in patches, especially on the two margins, where the band would be. Therefore, I have been uncertain as to the position of this individual. But I have recently received two males from Mr. Fletcher, and six males and one female from Mr. Neumoegen, all taken by Mr. Bean at Laggan, kindly loaned me for examination, and this new material makes it certain that

Digitized by Google

the species is *Subhyalina*. All these examples are remarkably transparent, and on the disk of forewings beneath there is almost a total absence of dark or mottled scales. But, at the apices there is decided mottling, the light colour prevailing. Some, however, have fine brown scales in the upper interspaces as well as over the cell. One male has two light subapical dots on upper side, though without black centres, the others show no trace of these. On the under side of the hind wing all these examples agree with the description, and are spotted and mottled with black and dirty white. In respect to the band there is extreme variation, some being quite unbanded, though in these the disk is more or less clouded darker; others have a pale band. One male and the female show an indistinct outer edge of the band, which answers to the description, "a waved and curved pale line"; and two males present the band clearly defined on the posterior side, and nearly so on the basal; but the band is, after all, scarcely more than a shadow, nothing so distinct as is usual in the allied species. As to whitish dots on the margins, three males and one female have them, the rest do not.

Mr. Butler gives "Arctic America" as the locality of this species, but I know of no other than Laggan.

I shall give a plate in Butt. N. A. to Subhyalina presently.

ADDENDUM.

After I had sent the foregoing lines to the editor I received two more females of the species treated of, from Dr. Skinner, from Laggan like the rest. One of these in no way seems to differ from the female before described; but the other varies in that half way between the outer edge of the band and the margin, on four interspaces, in the middle of each—the lower subcostal to second median, is a small whitish spot, clearly defined on the two lower interspaces, diffused on the others. This character agrees completely with the description by Curtis as to "three or four whitish dots beyond" the middle of the wing. I find therefore in one or other of the twelve examples viewed, every one of Curtis's characters except black points in the apical spots. But in only one of the twelve is there any appearance of apical dots on upper surface and in only one whitish dots beyond the band. The same female which offers the dots beyond the middle differs from the other eleven, in having a row of whitish dots on the corresponding interspaces of the forewing, two fifths the distance from the margin to apex of the cell, in a straight line, not parallel therefore to the margin. All three of these

Digitized by Google

females have the band undefined, cloudy. I see that occasionally in a dark *Semidea*, white spots are present in similar position on the under hind wing to that of this last-mentioned female *Subhyalina*.

FIELD NOTES FROM TEXAS AND LOUISIANA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

In the summer of 1892 I spent a month on the line of the Southern Pacific R. R., between Morgan City, Louisiana, and San Antonio, Texas. While the collecting was by no means of the best, a few notes may interest the readers of the CANADIAN ENTOMOLOGIST and give some idea of insect life in the Southern States during the hot months.

Morgan City lies to the west of New Orleans on the Atchafalaya River, in a country so flat that, as the natives say, "Water will only run as far as you dig a ditch for it." The neighbourhood is covered in great part by heavy woods, with a rank underbrush of poison oak, trumpet creeper and palmetto, the ground beneath all being, at the time of my visit, soaked with rains and dotted with innumerable pools of water in which mosquitoes were freely breeding. Along the edge of the woods I had to do the most of the collecting, as I found it quite an impossibility to brave the attacks of the mosquitoes and Tabanidæ in the depth of the forest.

The palmetto proved to be the plant best worth hunting over, and when I arrived on the twenty-second of June it was in bloom, or just going out in some cases. Where the flowers were fresh and sweet there were numbers of *Euphoria sepulchralis* and *Trichius delta*, the latter the less numerous and very hard to capture in the bright sunshine, though when cloudy weather prevailed they were much more sluggish. *Chauliognathus marginatus* occurred on the flowers in numbers, but it was not considered worth while to take many of them, as it appears to be common from Pennsylvania south, though I never take it in Iowa. *Paria canella* occurred once in a while, and a single specimen of *Phyton pallidum* was also shaken into my umbrella. When the flowers had fallen off, disclosing the newly-formed fruit, I found a very nice Curculionid beetle, *Pachybaris porosus*, which was known previously from Florida. It seemed not to occur on the plants except where the flowers had commenced to drop off, and quite likely oviposits on the newly-formed fruit. Wherever an open patch allowed a chance for growth of wild sunflowers, there were a good many beetles of other kinds—*Mecas inornata*, *Systena*,

Digitized by Google

sp., and a *Baris*, which seems to be new. A Solanum yielded a few specimens of an *Anthonomus* and a very small specimen of *Trichobaris trinotata*, a species which has proved in places a very serious pest to the potato. By scratching away dead leaves in a thicket a few *Lachnosterna ephelida* were secured, and a few also of *Anisodactylus maculicornis*. A rotten log, on being broken, disclosed an example of *Chlænius fuscicornis;* another contained several specimens of *Passalus cornutus*, with its larva. An ant's nest held, besides the legitimate inhabitants, a number of the curious little *Limulodes paradoxus*, which I have found with ants from Iowa to Arizona. Dry fungus was full of *Ennearthron*, and in it I found also a specimen of *Euplectus linearis*.

At night, around the light, I added still a few species to my collecting bottles—*Hippodamia parenthesis*, *Atænius figurator*, *Cyclocephala immaculata* and *Lachnosterna ephelida*, but insects were not by any means as common as I had expected them to be, so on the twenty-sixth I left for Houston, Texas.

The next afternoon, arrived at Houston, I found inside of the city limits great numbers of a beautiful weevil, *Eudiagogus pulcher*, which has a curious habit in lieu of dropping off the food-plant, as is usual with most Rhynchophora when disturbed. It feeds on the leaves of the coffee-weed, and usually remains on the upper surface of the leaf while eating in plain sight. If disturbed, it whirls quickly around to the under surface of the leaf, and either remains clinging there or runs rapidly down the stem of the plant towards the ground, keeping to the under side, so as to be invisible from above. With it I found associated *Anomœa laticlavia* and *Neoclytus erythrocephalus*.

Along the sides of the track, where the vegetation was rank, I got a few beautiful specimens of *Œdionychis* and a few of *Paria viridicyanea*. Under a stone occurred several *Psammodius nanus* in burrows which they had made just at the surface of the ground, much as some Scolytidæ bore in bark. A stump covered with fungi was next investigated and proved quite a rich find, yielding *Platydema* of two or three species, *Hoplocephala bicornis*, *Tritoma erythrocephala*, *T. angulata* and *T. atriventris*, besides several examples of the pretty little *Formicomus scitulus*, which seemed not to live on the fungi, but on the ground near them.

The woods themselves yielded beetles of a different sort. Beating branches of lately cut pine trees was productive of a number of *Drasterius amabalis*, a few *Silvanus rectus*, and a few other things. A little *Mono-*

Digitized by Google

hammus of the form called *minor* was taken, also a *Buprestis* and a *Chalcophora*. Where a live oak was being cut up I found *Chrysobothris femorata* var. *Alabamæ* and *Neoclytus scutellaris* running over the branches, but they were wild and difficult of capture. A large fungus was found to be often infested by *Pocadius helvolus* and a smaller one by *Pallodes silaceus*. Of these latter, when the fungus was small only one or two specimens were found in it, but larger fungi yielded more beetles. Five or six specimens of *Octotoma plicatula* were taken on leaves, and looked very little like living things when at rest.

Washing the banks of a stream brought very little to light, except a few specimens of *Tachys* and a very small *Heterocerus*; water-beetles were almost entirely absent. One incident of interest was noticed here, however, when a little *Tettix* (I use the generic name in the old, wide sense) was disturbed and jumped into the water, alighting on a stick that was completely submerged to the depth of about an inch, and rested there until I captured it. This brings to mind a note of Mr. Roberts in "Entomologica Americana," where he states that he found *Stenus* on masses of frogs' eggs which were completely submerged.

Collecting on weeds along the edges of woods and in open patches disclosed a number of *Conotrachelus leucophæatus* in the heads of a plant with milky sap, and with them occurred large numbers of *Aphthona texana*, a little jumping beetle of rather slow movements. I took all of them with my fingers without great trouble. *Henous confertus* runs around in grassy places during the morning and evening, having apparently the same habits in this respect as many of its wingless relations.

A day was spent in making a side-trip to Galveston to get in sea-shore collecting. The beach was alive with *Cicindela saulcyi*, but the only other Coleoptera there were *Phaleria* sp., and an Oedemerid, probably an *Asclera*. Farther back, out of reach of the tides and salt spray, I got a great number of *Haltica punctipennis* which was swarming on some low weeds.

Columbus was reached on the morning of July fifth, and work commenced at once. Though only a few hours ride from Houston, it is in quite a different looking piece of country. The valley of the Colorado here is wooded with deciduous trees, the pine having disappeared, and the better drainage is apparent from the nature of the soil. This spot was made historic in the annals of Entomology by the labours of Mr.

Digitized by Google

Schwarz, and the papers of Drs. Leconte and Horn of a few years back are full of allusions to species collected there by him. I hoped to find it an interesting field, and was not disappointed.

Most of the work was done along the river bottom, where the cottonwood timber was usually sufficiently free from underbrush to admit of freedom of movement and of sight. The felled trees, when the bark was peeled off, furnished *Toxidium compressum*, *Litargus balteatus*, *Epierus regularis* and *Bacanius punctiformis*. Beneath the old trunks were found *Blapstinus fortis* and *arenarius*. The cow-droppings were productive of *Copris carolina*, *Phanæus triangularis*, *Onthophagus pennsylvanicus*, *Aphodius tenuistriatus* and *stercorosus* and *Cercyon variegatum*. The banks of the river were covered with *Cicindela rectilatera* and *C. sperata; Tetragonoderus fasciatus* and *T. latipennis*, the latter abundant, were to be obtained in more circumscribed spots with a species of *Stenus* near *stygicus*. The weeds on the bars, on being pulled up, were found to shelter around their roots a colony of *Agonoderus comma*, *Anthicus difficilis*, *A. nanus*, *Metachroma interrupta* and *Myochrous denticollis*. This *Myochrous* was also often found feeding on willows.

On leaving the immediate vicinity of the river and working along the roads, *Languria læta* is found commonly with *Acylomus calcaratus* and *Conotrachelus leucophæatus*. Arriving at a point where a little creek crossed the road, I ascended it, and where a tree had been felled across it some years ago and was consequently in a rather advanced stage of decay, settled down for an hour or two of solid work. By peeling off the bark carefully I was able to get everything worth taking, as whatever was nimble enough to escape my bottle at first, fell into the water and was easily secured. The results were two *Mallodon dasystomus*, several *Eupsalis minuta*, *Platydema ruficorne*, *flavipes*, *lævipes*, *Eustrophus bicolor*, and several other things. Leaving this spot and going on to a freshly cut mesquit, I got under the loose bark four or five specimens of *Conotrachelus anaglypticus*, a few *Carpophilus semitectus*. and some *Laemophlœus chæmeropis*. Under damp logs I found the specimens of larvæ, pupæ and imagines of *Epipocus* described in another paper.

After a week's stay at Columbus I moved on to Harwood, which is at a considerably higher altitude—here the cottonwoods were gone and replaced by mesquit and oak, much of it "scrub." The collecting was not nearly so good and of a different character, *Eleodes tricostata* being one of the most prominent beetles. Two or three *Pasimachus* were found under

Digitized by Google

logs, also a pair of *Romaleum atomarium* and a large *Mallodon serrulatus*. *Acmæodera pulchella* var. *mixta* and *Bruchus amicus* occurred on flowers. The leguminose trees and shrubs yielded, by beating, *Cryptocephalus defectus*, *Epicauta nigritarsis* and *Coleocerus marmoratus*, while under the bark and in the wood of dead trunks and branches I took a number of *Phlœonemus catenulatus* and *Trogoxylon*, sp, besides a fine *Amphicerus*. The dead wood was full of cerambycid larvæ.

The next stop was made at Luling, in the San Marcos Valley, a spot which pleased me more than any other in Texas. The river bottom is heavily wooded in places, and the holes and cracks in the great trees were the hiding places of beetles of large size and great beauty. The fine *Zopherus haldemanni* was taken here in some numbers, sometimes resting on the surface of logs which were lying on the ground, or, just as often, climbing on the trunks of trees seven or eight feet up. Besides these I got a large *Mallodon*, two *Alaus lusciosus* and a number of *Strategus julianus*, the last nearly all dead but in perfect order—sometimes not yet stiffened. They occurred in holes where trees had been torn up by the roots, or often simply lying on the ground without cover or protection of any sort. *Photuris pennsylvanica* was found very commonly in one spot, clinging to the trunks of trees close to the ground, while three or four *Chlænius orbus* were taken beneath logs in damp places. A pair of *Canthon cyanellus* were detected in the act of inspecting a dead clam on the river bank and were promptly "run in."

The weeds along the roads were full of a species of *Chrysomela*, for which I can get no name. The great compositæ by the edges of the cotton-fields furnished numerous *Lixus laesicollis*, *Smicronyx obtectus*, *Pachytychius amoenus*, and some other weevils.

San Antonio did not prove to be in as good a locality for beetles, and only in a few favoured spots could anything be found. Beating along the track of one of the lines of railroad proved more productive tnan anything else, and in this way I obtained a number of *Cryptocephalus defectus*, *Coccinella abdominalis*, *Epicauta nigritarsis*, and a little Galerucid not yet described. The banks of the river, close to the source, yielded *Ega sallei*, *Oodes* sp., *Ochthebius foveicollis*, and *Limnichus lutrochinus*, with several other things; but the great haul of the season was a lot of several dozen assorted ticks, which I collected on my own person after sitting on a stone in the woods for a few moments to eat my lunch.

Digitized by Google

A NEW GASTROPACHA.

BY J J. RIVERS, UNIVERSITY OF CALIFORNIA, BERKELEY, CAL.

Phyllodesma Dyari, n. sp.—General appearance of the palest sienna or yellowish-ochre. Thorax and patagia thickly clothed with short hair of a uniform pale tone, the abdominal covering similar, but longer and finer, which gives to it a slightly silky appearance.

♂. Anterior wings with the anal angle deeply emarginate; three lines of dusky spots cross the disc ending near the costa, these being lines rather than bands. There are in some examples two dusky spots, one more conspicuous than the other, in the discal space. From the hind margin up to the middle line of spots, and extending to the apex of the wing, the area is of a rosy or peach-brown; the remainder of the wing being paler and colder in tone, in fact ochry-yellowish.

Posterior wings with the usual deep emargination on the costa. From just above the anal angle, a pale and rather wide band runs across towards the outer margin; this pale band widens on the inner margin when in contact with the abdomen, and this part of the wing is clothed with the same long filament-like hairs as the abdomen.

Fringes of all the wings rusty and white in separate rows of scales, the basal row being rusty and running out and covering the points of the nervules, while the white scales are seen only in the hollows of the crenations.

Beneath, pale rosy-brown, a darker central band traverses all the wings, beginning near the costal edge of the forewings, and finishing short of the anal angle of the hind wings. There appears on some specimens only, a short second band, when the ground colour between them is whitish. In the central area bordering the emargination of the hind wings is a wide patch of rusty brown.

♀. General appearance much paler than in the other sex, being very pale creamy or ochry-yellow. Margins of all the wings crenate; strongest on the hind margin of the posterior wings and decreasing in boldness towards the apex of the anterior wings. There are faint lines of spots on the disc of the forewings, suggestive of bands, and on the hind wings the only variation of the same pale expression of the whole insect is a broad, well-defined band of a lighter colour, that crosses the wing from above the anal angle.

Beneath uniformly pale ochry-brown, with a large attendant patch, conspicuously darker, in the immediate region of the emargination of the hinder wings.

Expanse of wings, ♂, 1.55–1.80 inches; ♀, 2.25 inches.

Habitat: El Paso, Texas.

Digitized by Google

THE BUTTERFLIES OF LAGGAN, N. W. T.; ACCOUNT OF CERTAIN SPECIES INHABITING THE ROCKY MOUNTAINS IN LATITUDE 51° 25′.

BY THOMAS E. BEAN, LAGGAN, ALBERTA.

(*Continued from page 132, Vol. 22.*)

ELEVATIONS IN VICINITY OF LAGGAN.—Altitudes near Laggan have in some cases been very incorrectly stated. In "Appleton's Canadian Guide-Book; Western Canada," published 1892, the altitude of Louise Lake (Emerald Lake of the Geological Survey) is given as one thousand feet above Laggan, and the elevation of Agnes Lake is stated at three thousand five hundred feet above Laggan. Such statistics are worse than useless.

The elevation of the Canadian Pacific Railway at Laggan, by latest profiles, is five thousand and eight feet. Emerald Lake is five hundred to six hundred feet higher—its elevation can hardly exceed five thousand six hundred feet. Agnes Lake is about two hundred feet below the normal timber-line, so that its altitude is not far from six thousand eight hundred feet; it is eighteen hundred feet above Laggan, and pretty ac curately twelve hundred feet higher than Emerald Lake.

According to the Geological Survey Reports, timber-line on the mountains around Laggan occurs at about seven thousand feet. This elevation compares with an altitude in Colorado of something over eleven thousand feet. Gannett's "Dictionary of Altitudes" gives U. S. Survey estimates of 31 timber-lines in Colorado, of which 29 are above eleven thousand feet.

CARTEROCEPHALUS PALÆMON, Pallas.

Paniscus, Fabricius.

Mandan, Edw.

Material of *Mandan* examined:—1 ♂ from Nepigon (Mr. Fletcher); 36 local ♂s, some imperfect, but nearly all bright and readable; 1 ♂, 1 ♀ from Banff (Mr. H. K. Burrison); 12 local ♀s, all being legible, and 8 of them bright and fine. Examples of *Palæmon* compared:—4 ♂s, 2 ♀s from Germany; 2 ♂s, 1 ♀ from Zurich, Switzerland; 2 ♂s from northern Finland.

This examination was undertaken because from frequently repeated comparisons of the Bow Valley *Mandan* with *Palæmon* the essential agreement of the two had become evident. Until this final study was

Digitized by Google

made, I had thought *Mandan* of New England and eastern Canada might be distinct not only from *Palæmon* of Europe, but also from *Mandan* of the Bow Valley. That idea I can no longer entertain. The amount of variation among my few instances of *Palæmon* proves to be greater than I have hitherto considered it, and this fact lessons the probability that the name *Mandan* covers two species. My reasoning is:—(1) The European *Palæmon* is so uniform in size and colour, and presents its variations in a manner so undemonstrative, that the true values of its variations are easily recognized, and it is readily seen that the several variational phases constitute but a single species. (2) *Mandan*, like many other of our lepidoptera, is strongly influenced by the meteorological peculiarities of widely separated districts inhabited by it in North America, and in certain extreme conditions displays its variational capacity with a freedom, an exuberance, quite in contrast to the conservative variation of species in Europe. (3) As I find the variation in *Palæmon* essentially as important as the more emergent and erratic variation shown in certain environments by *Mandan*, and as *Palæmon* in its various attitudes is inseparable from corresponding aspects of *Mandan* and helps to render evident the unity of *Mandan's* extreme phases, I am therefore led to believe *Mandan* contains but one species, although it has been so well supplied with synonyms and its extremes of colour variation are so great.

In the material at hand, together with the *Mandan* literature accessible, I find no indication of more than one species, unless it be the difference in food-plants—The Nepigon and Bow Valley sections eating grasses, while *Palæmon* of Europe is said to feed on *Plantago major*. This diversity does not greatly impress me, as the "unexpected" in that line often happens. After discovering (Aug. 5, 1889) that *Colias nastes* eats Willow, and having (in August, 1890) persuaded *Grapta zephyrus* to accept a diet of rose, I am prepared for almost any specialty in food-plants. *Melitæa anicia* feeds on two species of plants, or more; so does *Lycæna aquilo*.

From the insects compared I have the following information. The Banff specimens agree with the Laggan series. The Nepigon ♂ is almost a copy of one Finland ♂—if smaller, the difference is very slight; it differs above forewing in having the median yellow-brown spots shorter (partly obliterate); on under side the Finland example is more suffused with yellow and the spots under hind wing are less clear; in every

Digitized by Google

essential character the two insects are alike. The Bow Valley material has been determined as *Mandan*. If it is *Mandan*, then *a fortiori* it is also *Palæmon*, for it is closer to *Palæmon* of Germany than to the *Mandan* of eastern North America Arranging the entire series according to affinity of variation, the Nepigon specimen goes to one extreme, next in order follow the two Finland *Palæmon*, then two of the *Palæmon* from Germany, and a number of the Bow Valley *Mandan*. Nearly all the remaining Bow Valley *Mandan* range still further away by an increasing size and boldness (conspicuousness) of the fulvous spots above primary, these spots being in some specimens so enlarged as to replace almost entirely the dark brown of general surface. The two *Palæmon* ♂ s from Switzerland, two of the German *Palæmon* and a small section of the Bow Valley *Mandan* ♂ s follow a line of variation somewhat diverse from what is seen in the major part of the series, but without special bearing on the main question, except as further illustrating the fact that *Mandan* is more ready to break ranks than is consistent with due respect to "the authorities." In one particular, all the North Americans examined are alike—the spots under hind wing are clear in colour and distinctly in contrast to the ground colour. Part of the Europeans agree with the North American specimens in this, and the others have the spots suffused with dull yellow as in *Carterocephalus silvius*. The description of *Mandan* in Fernald's "Butterflies of Maine," indicates that the Maine *Mandan* is practically like that of Nepigon, and that the spots below hind wing are clear in colour; the description in general covers *Palæmon* equally with *Mandan*. Mr.W. H. Edwards, in his description of *Stereoptes skada*, mentions that the spots below hind wing, except the outer rows, were of a yellowish tint. Mr. S. H. Scudder describes the spots beneath hind wing of *Hesperia mesapano* as "very large silvery white spots"; in the Laggan specimens the colour is a pale buff, scarcely white in any.

Mandan in the greater part of its range seems to be extremely rare. A few captures have been recorded, made in New England and at various localities in the Province of Quebec, with one or more in Alaska and Labrador. It appears to have been found in frequency only in two districts—the region between Hudson Bay and Lake Superior, and the Bow Valley. Mr. James Fletcher's records for Nepigon are well known. Mr. J. Jenner Weir, in THE ENTOMOLOGIST, writing of lepidoptera collected chiefly at Moose, on south coast of Hudson Bay, makes this record :—

Digitized by Google

"*Heteropterus mandan*, Edw.— Much resembles *H. paniscus*, Fab.; common in 1883, but not observed before."

A specimen of *Mandan* was in 1872 determined by Mr. H. K. Morrison as *Paniscus (Palæmon)*. In an account of lepidoptera collected on Anticosti, Mr. William Couper writes:—"*Hesperia paniscus*, Fabr.—A single specimen captured at Fox Bay, Anticosti, on the 26th June. It was sent to Mr. Morrison, who informs me that it does not differ in the slightest from the European specimens of *paniscus*. It is close to *Mandan*, Edw."—(CAN. ENT., Nov., 1872.) At that time *Mandan* was excessively rare in collections.

Carterocephalus palæmon of the Bow Valley is larger than the same species in Europe and eastern North America, and is more variable in size, ranging from expanse of the Finland and Switzerland instances to a size noticeably exceeding that of the German examples. It displays greater individual variation also as to size and colour of the fulvous spots above forewing. At Laggan it chiefly frequents grassy meadows along the Bow at an altitude of 4,800 to 5,000 feet, the ♂ in ordinary seasons appearing early in June and the ♀ during last half of the month. Several ♀s have been taken at Emerald Lake in early July, and 1 ♀ at Agnes Lake early in August. It occurs also at Stephen, B. C., six miles west of Laggan.

This is one of those species which come from pupa earlier or later according to the forwardness or tardiness of the season; it is by no means so prompt to a date as are some of the local butterflies. There is no indication of more than one flight in a season.

ADDITIONAL NOTE ON THE LARVA OF PALÆMON.

After sending away the foregoing, a very interesting article was me, with in *The Entomologist* (London, England), Oct. and Nov., 1892, which tends to confirm my views already stated:—"Life History of *Carterocephalus Palæmon*, by F. W. Frohawk, F E.S." So far as I can judge Mr. Frohawk's account of the larva of *Palæmon* agrees substantially with the description of the larva of *Mandan* published by Mr. James Fletcher in CANADIAN ENTOMOLOGIST, June, 1889. My main object in the present reference is to mention that *Palæmon*, as well as *Mandan*, eats grasses. Mr. Frohawk reared his larvæ with success on *Bromus asper*.

My own incomplete notes of the local larva, from observations made in June, 1889, agree entirely with Mr. Frohawk's account. An interesting fact in my experiment was that several of the eggs were laid by lamp

Digitized by Google

light at eleven o'clock one night. The young larva emerges near apex of egg, and usually eats little, if any more of the shell than sufficient to allow of his exit. The larvæ fed on grass.

I make no citations from Mr. Frohawk's article. It should be read entire by all interested in the subject.

ADDITIONS TO THE LIST OF CANADIAN LEPIDOPTERA.

BY J. ALSTON MOFFAT, LONDON, ONT.

During the years 1891 and 1892, I have received the following names new to the Canadian list. Some of the specimens have been in my possession for several years, as I hoped to secure others of the same kind, whereby I might obtain their names without inconveniencing anyone by a request for their return. But they remain uniques with me to the present time; solitary witnesses to the fact that they are to be got, if looked for in the right place at the right time.

The gentlemen to whose kindness I am indebted for the identification of my material are: Prof. J. B. Smith in the Bombycidæ and Noctuidæ, Rev. Dr. Hulst for the Geometridæ, and Prof. C. H. Fernald in the Micros. I have followed the sequence and nomenclature of Prof. Smith's list of 1891.

Scoleocampa liburna, Geyer.

I captured this specimen at Ridgeway in July, 1885. And I see by the Buffalo list of 1891 it is therein reported as "taken occasionally in Lancaster, at light," by Mr. E. P. VanDuzee. I am not aware of its having being taken in Canada since.

Epiglæa decliva, Grote.

A single specimen taken at Hamilton eight years ago, in the autumn, when looking for Scopelosomas and Lithophanes.

Xylina tepida, Grote.

A single specimen taken at London, September 29th, 1891. On one of my visits to Mr. Grote in Buffalo, whilst he was naming some Lithophanes for me, he called my attention especially to this species as "one that ought to be found with us," and yet this is the first intimation that I have received of its being taken in Canada.

Litognatha litophora, Grote.

Herminia petrealis, Grote.

Hypena damnosalis, Walker.

Digitized by Google

No doubt several more of the Deltoides might be added to our list, if they were closely looked after, but the unattractive appearance of many of them, and the difficulty in separating the forms, has a tendency to weaken the interest taken in them.

Acidalia subalbaria, Pack.

Eudeilinea herminiata, var. *albata*, Guen.

Semiothisa præatomata, Harv.

Tephrosia cognataria, Hub.

Paraphia unipunctaria, Haw.

Petrophora truncata, Hub.

Phlyctænia extricalis, Guen.

Homophysa psychicalis, Hulst. Two specimens taken at London in 1892. This handsome little species was described and named *Botis psychicalis* by Dr. Hulst in 1886, from two females taken in Georgia and Texas.

Hydrocampa stenialis, Guen.

This delicate and highly ornamented species I had taken at Hamilton for several years, one or two in a season, although only obtaining the name of it last November. During the season of 1892 I came on a colony of it at London and secured six. It is variable in size and depth of colouring, but varies little in the design of ornamentation, considering it is so elaborate. Dr. Hulst redescribed a specimen from Florida, under the name of *H. australis*. He gives the expanse of wings as 16 mm. I have one that is 15 mm., but I also have one that is only 10. Dr. Hulst gives the colours as fuscous and light ochreous. One of my specimens is of a deep leaden hue, with the light portions greatly reduced in size.

Schœnobius melinellus, Clem.

Perispasta caeculalis, Zell.

A single specimen taken at Hamilton several years ago. It was sitting on the upper side of a leaf quite exposed. Its unusual form and marking attracted my attention at the time, and although I looked for it regularly afterwards in that locality, at the same season of the year, I never came upon another, and the only other one I have seen was sent to me for determination by Mr. Winn, of Montreal.

Perispasta immixtalis, Grote.

A single specimen taken at London in the season of 1892, and that in rather poor condition.

Digitized by Google

Teras nivisellana, Wlsm.

" *variana*, Fernald.

Cacœcia rosana, Linn.

Œnectra pilleriana, Schiff.

Exartema punctana, Wlsm.

This attractive species I had been taking for a number of years at Hamilton, one and two specimens in a season. It was moderately plentiful in one locality at London during the early part of July, where I secured about a dozen and a-half specimens of it. It is quite variable in size and depth of shading. My specimens range from 15 to 25 mm. in expanse of wing, the smallest males being, as a rule, the lightest in colour.

Sericoris bipartitana, Clem.

Pœdisca otiosana, Clem.

Semasia signatana, Clem.

Argyresthia andereggiella, F. V. R.

Laverna subbistrigella, Haw.

Butalis impositella, Zell.

THE SYSTEMATIC POSITION OF VARINA ORNATA, NEUM.*

BY A. S. PACKARD.

For a specimen of this most interesting moth I am indebted to Mrs. Slosson, and after an examination of it I am unable to find any Bombycine characters, except the heavily pectinated antennæ. In Prof. Smith's List of Lepidoptera it is placed in the Liparidæ between Artaxa and Lagoa, though it bears no resemblance to these moths except in the shape of the antennæ. It has also been regarded as allied to the Cochliopodidæ. Prof. Smith has recently stated that it is a synonym of *Acherdoa ferraria*, Walk. (See CAN. ENT., xxiv, 135, 1892). It appears from its heavily pectinated antennæ to belong among the Noctuo-Bombyces, and all its characters indicate its affinities with the Noctuina. On denuding the head, the front is seen to be very full and convex, and those who claim that the characters of the head are useless in distinguishing families, we would refer to this case, as no Bombycine moth with which we are

*Papilio iv., 94, 1884.

Digitized by Google

acquainted has such a full, protuberant front. The palpi are also truly noctuid in shape, the joints being very distinct, the 3rd joint long and slender compared with those of the Bombyces. The forewings have a well-developed dot and reniform spot, genuine Noctuid marks, and the hind wings have the peculiar gloss of Noctuid moths. The venation of the wing is unlike that of the Liparidæ and Cochliopodidæ, and entirely unlike that of the Notodontidæ. There are 4 branches of the median vein, and their arrangement and that of the subcostal veinlets appears to be characteristically Noctuid.

I am confirmed in the view that this moth belongs among the Noctuids by the following observations of Mrs. Slosson, who was fortunate enough to hatch out the larvæ, and to find that they are semiloopers, like the freshly-hatched larvæ of many Noctuids.

"I captured at light, in the spring of 1891, a *Varina ornata* ♀ and placed her at once in a box made for the purpose. But when I opened the box for examination I found to my chagrin, that I had unfortunately closed the lid upon my treasure and crushed her to death. As the abdomen seemed somewhat distended, I pressed it gently, and had the satisfaction of seeing two eggs drop out. I could secure no more. As it was late at night and my light was poor, I deferred close examination of the eggs. The next day I was attacked with neuralgia in the eyes, and was quite unable to use a magnifying glass. On the 6th or 7th day the eggs were hatched. I was still suffering, and could make no close observations. But one thing was plainly to be seen, the larvæ were "loopers"! This I could see for myself, and an unscientific friend who looked at them through a lens at once declared them to be "measuring worms." Knowing nothing of the food-plant, I sent out for leaves of the various trees and herbs growing near. But the larvæ would eat nothing. On the third day, though still alive they were very weak. I placed a bit of palmetto—*Sabal serrulata*—in their glass, and they at once crawled feebly upon it, and began nibbling its surface. But it was too late, and not knowing how vastly important to science would be a prolongation of their existence, they quietly passed away. I regretted deeply my lost opportunity of settling finally the proper position of this interesting moth. But I can but consider this proven fact of the young larvæ's being loopers a very significant one."

Digitized by Google

CATOCALINE MOTHS FROM GEORGIA.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In the collection of the Bremen Museum are a number of *Noctuidæ Catocalinæ*, brought by Norwich, many years ago, from the vicinity of Savannah, Georgia, and belonging to species for the most part new to me. Nearly all are now identified by me as described by Guenée in the Species General, and their notice here can hardly fail to be of interest. I have previously remarked upon the fact that, as we progress southwardly, we are met by an increase in the number of species of Catocaline Owlet Moths, while the *Noctuinæ*, or typical *Noctuidæ*, diminish; the metropolis of the former seems to lie in the Tropical, of the latter in the North Temperate Zone. But already in the Southern States we meet with many species of Banded Owlets, which seem absent in Canada and the Northern United States.

GRAMMODES, Guen.

Guenée describes in the Species General three North American species, *Smithii*, *Similis* and *Consobrina*, under the generic term *Ophiusa*, Tr., a name which, being pre-occupied in zoology, cannot be retained. These three species, then unknown to me in nature, I referred temporarily to the genus *Grammodes*, in the Buffalo Check List, 39, 1876, as also in the New York Check List, 39, 1882. This course is followed by the Philadelphia Check List, 57, 1891. At this writing I have not the necessary means or material to satisfactorily review the generic position of the species described in the present paper. Of Guenée's three American species of *Ophiusa*, two, *Smithii* and *Consobrina*, are now identified by me in the Norwich collection. These two are closely allied, so much so that, at the first glance, they seem the same, though readily distinguished. Under these circumstances it seems inexplicable to me that Guenée should place them in two distinct groups, and should interpolate a group and follow *Smithii* with a species, *similis*, which, from the description, must differ somewhat widely in appearance. The two species before me seem allied to *Euclidia cuspidea*, while in the dusty-gray colour, texture and vestiture, they resemble *Drasteria*. They are distinguished by the fine, even, cleanly-cut and very distinct median lines. All the species here included have a deep brown or blackish, apical, liturate mark. That they will remain under this generic title, which is only a substitute for *Ophiusa*, as used by Guenée for them, does not seem probable to me.

Digitized by Google

1. SMITHII, Guen., Sp. Gen., VII., 266, 1852, *Ophiusa*.

The forewings are powdery light ash-gray over brown, with a slight violaceous reflection. The brown colour appears as a diffuse deeper shading before the t. a. line, and again before the t. p. line over the outer portion of median space. T. a. line narrow, brown, slightly bent and relieved outwardly against the gray median space. T. p. line similar in appearance, but very cleanly cut and even, forming two angles outwardly; the first and most prominent opposite the cell, the second projection on the interspace above vein 1; thus the line forms three subequal scallops, the upper one shallower and more oblique, the middle one the longest. A deep brown, inwardly oblique, shaded apical mark, terminating in a second linear one, which appears as if dislocated and turns outwardly. Hind wings obscure brown, a little dusted with grayish on the outer margin before the angle. Beneath both wings concolorous, paler yellowish-brown, with a faint darker median line and discal point. On primaries above the brown reniform is feebly marked. Body concolorous. Two female specimens examined, expanding 37-38 mil. In Mus. Brem.

Guenée names this species for one of the authors of the "Insects of Georgia."

2. CONSOBRINA, Guen., Sp. Gen., VII., 1852, *Ophiusa*.

Almost exactly like *Smithii*. The base of primaries somewhat darker shaded, hardly ashen; the liturate apical mark seems to run inwardly obliquely throughout its length and is uniformly preceded by a deep brown shade, appearing continuous. The t. p. line wants the second angulation and thus forms a single curve from a point opposite the cell to the inner margin. These seem the only differences in markings. Two males examined, expanding, one 40, the other only 35 mil. In Mus. Brem.

I regard it as not impossible that *Consobrina* is the male of *Smithii*. The antennæ in both are simple, the joints provided with short hairs beneath. The terminal joint of the palpi appears to be shorter in *Consobrina*, and probably really is so, but this feature might be sexual. Guenée does not note the sex of his material. In ornamentation the only differences I find are in the apical shade and the t. p. line; this latter character alone is strongly marked and leads one to suspect a distinct species. The difference in size noted by Guenée (p. 268) does not exist. In this group of moths the male is not infrequently much larger than the

Digitized by Google

female, but is inconstant in size of wing. One specimen of *Consobrina* is in this respect smaller than *Smithii*. As to the difference in shading, it appears to me quite unimportant and not unlikely a variable character.

3. SIMILIS, Guen. Sp. Gen. VII., 267, 1852. *Ophiusa.*

"40 mil. Wings entire, powdery, of an even violaceous ashen, shaded here and there with reddish; with the two median lines hardly visible, very fine and, between them, another similar line bent in an opposite direction to the t. p. line and nearly touching the latter at either extremity, the whole hardly distinct. A black apical mark, composed of two little triangles united at apices, a little shaded interiorly. Hind wings light brown, with the fringes ashen. Beneath of the same brown, with indistinct line and lunule.

Var. APICALIS, id. The arcuate median line largely shaded with blackish exteriorly."

This species is unknown to me. It cannot be the succeeding form owing to the given colour, the triangulate apical spots, and the arcuate median line.

4. CONCOLOR, n. s.

♂ Entirely of a light chocolate brown. The forewings unicolorous, with a slight frosty violet reflection, without any perceptible markings or any darker shadings, except the liturate dark brown apical mark, which is oblique, of nearly uniform width and subcontinuous. Hind wings plain brown, the outer edge and fringes very slightly shaded with ashen. Beneath paler, concolorous yellowish-brown, with faint traces of one or more common lines and discal dots. Palpi slightly exceeding the front. Antennæ simple, the joints beneath with short hairs. One specimen, expanding 42 mil., in Mus. Brem.

♀ Somewhat darker than the male. The frosty violaceous shade obtains strongly over basal half of primaries and allows an uneven darker t. a. line to be faintly visible. At the centre of the wing, in the place of the median shade, is a straight sharp line of demarcation, beyond which the wing is outwardly diffusedly much darker shaded, the dark colour fading to the fringes and allowing the apical mark to be plainly visible. In one specimen the apical mark is apparently linear and dislocated in-

Digitized by Google

feriorly. Else as in the male. In one specimen there are terminal dots near the anal angle of secondaries. Two specimens, one expanding 46 mil., the other only 38 mil. Savannah, Norwich, in Mus. Brem.

Renewed examinations of the male of this prominent and well-sized species show, that in certain lights exceedingly faint traces of the t. a. line may be discerned. But the brown surface of the wing is unbroken to the eye, without lines or discal spot, and is relieved only by the distinct apical mark.

AGNOMONIA, Hübn.

1. ANILIS, Drury, II., 21, Pl. XII., 3, 1770–1775.

Sequistriaris, Hübn., Zutr., 419–20, 1825, *Agnomonia.*

Anilis, Guen., VII., 273, 1852, *Agnomonia.*

Two specimens of this not unusual species from Savannah in Mus. Brem. In this genus the apices of forewings are sharp, the short fringes usually discolorous, the external margin sinuous or straight, not rounded; the forewings have a certain lustre on their upper surface.

2. QUADRIFILARIS, Hübn., Zutr., 569–70, 1825, *Agnomonia.*

Guen., VII., 300, 1852, *Poaphila.*

Two specimens of this well-marked species from Savannah in Mus. Brem. Smaller than *anilis*, of a lighter lustrous brown. The forewings crossed by two white median stripes, narrower than in *anilis*, and continuous, whereas in *anilis* the outer band is abbreviated. *Anilis* is much stouter with the external margin sinuate, curving inwardly below the apex.

3. OBSOLETA, Grt. Proc. Bost. Soc., N. H., 417, 1876, *Poaphila.*

Quadrifilaris, var. A., Guen., VII., 301, 1852, *Poaphila.*

Of this species, taken by Dr. Thaxter in Florida, there are no specimens in the collection. According to my observation, it is decidedly distinct from *Quadrifilaris.*

4. ERASA, Guen., VII., 301, 1852, *Poaphila.*

The forewings are of a somewhat grayish or fuscous-brown with a slight lustre, darker shaded outwardly. The markings are quite indistinct,

Digitized by Google

and only traces of the transverse lines can be made out. The short fringes are tipped with whitish; apices pointed, external margin quite straight. Hind wings without markings; abdomen somewhat grayish. An inconspicuous species, distinguishable by the pale fringes. One male before me from Savannah, expanding 31 mil., in Mus. Brem.

Probably most of the species referred to *Poaphila* in the Species General, and in our Check Lists, belong really to *Agnomonia*. Of the species described by Guenée I have not identified anywhere *Contempta* or *Bistrigata*. *Poaphila sylvarum*, in the collection before me, may be considered typical of its genus. *Flavistriaria*, *perplexa*, and *herbarum*, determined by me in Coll. Mus. Brem., are apparently related to *Phurys* and *Celiptera*, as also is *Bistrigata* from Hübner's figure. I have described two species in Bulletin, U. S. Geol. Survey, IV., 184, 185, which may also belong to *Agnomonia*. The types are in Coll. Brit. Mus. A name to be admitted must be sanctioned by figure or description. But what are we to do with the bad descriptions of the British Museum Lists? Can the supposed types of Mr. Walker be admitted as evidence? In cases where they in any way contradict the description I think certainly not.

PHURYS, Guen.

1. FLAVISTRIARIA, Hübn., Zutr. 555-6, 1825, *Crochiphora*.

Guen., VII., 302, 1852, *Poaphila*.

The forewings are grayish-brown, with a faint discal mark and a rigid ochre-yellow subterminal band, followed by a narrower dark brown shade line. Two specimens before me, which belong evidently to the species described by Guenée, but do not quite agree in shape of wing and appearance with Hübner's figure, while the only markings correspond, and these are so simple that it must be the species. The identification of *flavistriaria* has led me to that of Guenée's *perplexa*, described comparatively in the Species General. Guenée changes the specific name to *Flavistriaris*.

2. PERPLEXA, Guen., VII., 303, 1852, *Poaphila*.

Glans, Grt., Proc. Bost. S., N. H., 416, 1876, *Phurys*.

This species differs from *Flavistriaria* mainly by the concolorous pale gray colour, while the subterminal stripe has less yellow, the dark brown

Digitized by Google

line predominating. Faint indications of an uneven t. a. line. The discal mark almost obsolete. Faint terminal dots may be discerned. Hind wings gray without lines. Two specimens, Savannah, Georgia, in Mus. Brem.

The more of our species of Catocaline Noctuids, belonging to the group of which *Drasteria* may be considered typical, the so-called "Grass Moths," I have become acquainted with, the more do I see the necessity for their generic revision. But the material I have had at any one time has been so small and fragmentary that I have been unable to attempt it.

DESCRIPTIONS OF CERTAIN LEPIDOPTEROUS LARVÆ.

BY HARRISON G. DYAR.

Colias Behrii, Edw.

Egg.—Spindle shaped, a little contracted just before the tip, with low longitudinal and transverse ridges, which divide the surface into shallow, rectangular parallelograms. Length, 1.3 mm.; width, .6 mm. The eggs are laid singly on the upper side of the leaves of a species of ground huckleberry, its food plant.

First stage.—Head rounded, dark brown; width, .25 mm. Body of normal shape, sordid whitish, apparently without marks; minutely pilose.

Fifth stage.—Head rounded, very slightly bilobed, slightly reticulated with brown; no other marks; width, 2 mm. Mouth parts brown; ocelli and jaws black. An even, pinkish white dorsal line, very narrowly black bordered, runs the length of the body, tapering a little at each end, obsolete on joints 2, 3 and 13. A broader, even, subdorsal line, nearly white on the edges, salmon-coloured centrally, and bordered above by a black lunate shade on the anterior part of each segment. A similar, very even substigmatal band, pinkish centrally; the bordering black shades surround the spiracles and are larger and more diffuse than those above the subdorsal band, but very faint on the thoracic segments. A faint, even, lateral band, paler than the ground colour, which is probably some shade of green in living specimens. Spiracles white, the pair on joint 12 larger than the others. Thoracic feet testaceous.

Pupa.—This seems not distinguishable from that of other species of Colias. Thorax large, the back arched and cases prominent; abdomen

Digitized by Google

tapering; cremaster short, square at tip, flattened and firmly adhering to the silken web. It appears to have been yellowish-green, a lateral pale line on the abdomen, the antenna cases marked with pink.

Described from alcoholic specimens collected by Mr. J. B. Lembert in the High Sierras of California. Concerning the habits of this insect, Mr. Lembert writes :—"July 27th, about nine or ten in the morning of the third day of search, I discovered the food-plant of the hardy little mountaineer. His little queen fluttered into the grass on the meadows at the base of Mt. Gibbs. When she had laid about five or six eggs, she flew on to the dry moraine and sandy hills to eat flowers, and in the meantime another took her place. The eggs were deposited on the low growing huckleberry vine, which is lower than the grasses that it grows among, affording protection to the eggs and larvæ against the dews and frosts that prevail at any day on the highland meadows. The males outnumber the emales six to one, according to my catch, as the latter feed on the flowers growing on the old moraines which rise up out of the meadows, and only fly to the meadows to deposit their eggs.

When the larvæ get large they hide, and in the first stage they are almost invisible. When ¼ inch long they are semi-transparent; when ⅓ inch, they get about the colour of a lightly bruised apple and worm-like, without spines. They greatly resemble the withered huckleberry ruit. The eggs when first laid are glistening white, then dull white, and finally greenish. They hatch in six days."

Ichthyura vau, Fitch.

Egg.—Hemispherical, flat below, the shell semi-transparent white. Under the microscope it appears covered with small, slight depressions, closely crowded together and forming obscure roundedly hexagonal reticulations; diameter, .9 mm. Laid singly, or as many as seven together on the under side of a leaf. The larva hatches by eating a piece off of the vertex of the egg, which may remain attached to the shell like a circular trap door.

Third stage.—Head slightly bilobed, rounded, clypeus depressed, hairy, especially on the lower part; shining black throughout. Cervical shield and anal plate blackish. Body vinous-brown, with a broad band of sordid yellowish-white, absent on joints 5 and 12, and containing a

Digitized by Google

triple brown line. Subventral space, from the spiracles to the feet, irregularly mottled and streaked with yellowish. Feet black. The minute piliferous tubercles of rows 1 and 2 are stained yellow. Width of head, 1.2 mm.

Fourth stage.—Head round, full, pilose, blackish-brown, paler above the mouth and slightly shiny; width, 1.8 mm. Body largely obscure, purple-brown, this colour forming a triple dorsal line and covering the whole lateral area to the feet. Dorsum grayish-white between the lines, and this colour also obtains in a rather broad lateral line and minute mottlings all over the brown area, which are distinct without a lens only subventrally. Thoracic feet black, abdominal ones concolorous with the body. The tubercles are very inconspicuous, but row 1 is marked by little yellow dots through the whole length. The hairs are fine and short, pale, those arising from the body very much shorter than those from the tubercles. In another example joints 5 and 12 were seen to be slightly enlarged dorsally and coloured purple-brown, while all the turbercles of rows 1–5 were obscurely yellow.

Fifth stage.—Head slightly flat in front, blackish-brown, pale-purplish in the sutures; labrum sordid white; width, 2.3–2.5 mm. Body purplish-brown, marked as before, but the pale gray parts are slightly obscured by minute brown mottlings and the yellow piliferous tubercles are small but very distinct. Each bears its one hair and the rest of the body is minutely pilose. There are traces of a black bisected cervical shield; no distinct anal plate. In another example, the whole surface of the body was marbled with pale gray, greatly obscuring the lines, though the yellow tubercles were still distinct.

At maturity the body was sordid white, thickly mottled with pale brown, forming a faint triple dorsal, single subdorsal and stigmatal lines; spiracles black; tubercles orange.

Food-plant.—Species of willow (Salix). The larvæ live singly, each tightly wedged in a little house formed of leaves and silk, from which they come forth to feed. Larvæ from Boston, Mass.

Digitized by Google

NEBRASKA MYRIAPODA.

BY F. C. KENYAN, UNIVERSITY OF NEBRASKA.

Heretofore nothing concerning the Myriapoda of Nebraska has been published. Hence the following short list of species will not be without interest :—

Lysiopetalum lactarium, (Say).
Parajulus canadensis, (Newp).
P. impressus, (Say).
Spirobolus marginatus, (Say) Newp.
Leptodesmus floriaus, Wood.
Fontaria virginiensis, (Drury) J. E. Gray.
Paradesmus erythropygus, (Brandt) Wood.
Polydesmus canadensis, Newp.
P. granulatus, Say.
Scolioplanes bothriopus, (Wood) Mein.
Geophilus cephalicus, (Wood) Mein.
Geophilus bipuncticeps, Wood.
Scolopocryptops sexspinosus, (Say) Newp.
Scolopendra woodii, Mein.

Archilithabius malterris, sp. n.—Prosternal teeth, 2 + 2. Ocelli, 10–12, arranged in 3 rows. Antennal articles, 21. Coxal pores, 2, 3, 3, 2–3, 3, 4, 3, or 10–13, round. Spines on the first pair of legs, 2, 3, 1; on the penultimate pair, 1, 3, 3, 1; on the anal pair, 1, 3, 2, 0. Claw of female genitalia entire. Slender, light chestnut, head darker. Joints of antennæ rather long. Length, 12–13 mm.

From the Bad-lands, Sioux Co.

Archilithobius nebrascensis, sp. nv.

Prosternal teeth, 2 + 2. Ocelli, 11–15, arranged in 3 rows. Antenna; articles, 20–21. Coxal pores, 2, 3, 3, 2–3, 4, 4, 3, or 10–14. Spines on the first pair of legs, 1, 1, 1–1, 2, 1; on the penultimate pair, 1, 3, 3, 2; on the anal pair, 1, 3, 2, 0. Claw of female genitalia bipartite. Rather robust. Orange-brown; head darker, smooth; shortly pilose. Head subrotundate. First scutum, large, subquadrate. Antennæ, long, tapering, shortly pilose; articles long. Length, 11 mm.

Digitized by Google

A. dorsopinorum, sp. nv.

Prosternal teeth, 2 + 2.. Ocelli, 11–15, arranged in 3 rows. Articles of the antennæ, 21. Coxal pores, 3, 4, 4, 3–4, 5, 5, 4, or 14–18. Spines on the first pair of legs, 1, 2, 1–2, 3, 1 ; on the penultimate pair, 1, 3, 2. 1- 1, 3, 3, 2, on the anal pair, 1, 3, 2, 1. Penultimate pair of legs armed with 2 claws ; the anal legs with one claw. Claw of female genitalia tripartite.

Body depressed. Light brown ; head a little darker. Anal legs only slightly crassate.

This seems to be related to Bollman's *elatus*, but is distinguished from that species by having the ocelli and the coxal pores more numerous, and the spines of the anal legs differently arranged.

A. Bruneri, sp. nv.

Prosternal teeth, 2 + 2. Ocelli, 9-12, arranged in 3 rows. Antennal articles (♂)20–(♀)21. Coxal pores, round, 2, 3, 3, 2–3, 4, 4, 3, or 10–14. Spines on the first pair of legs, 0, 1, 1–2, 2, 1 ; on the penultimate pair, 1, 3, 3, 2 ; on the anal pair, 1, 3, 3, 1. Penultimate legs armed with 2 claws ; the anal pair with one. Claw of female genitalia entire.

Scarcely robust. Light chestnut ; head and first scutum darker ; pilose. Head subrotundate ; longer than broad. Antennal joint, head-like, thickly pilose. Body tapering anteriorly. Anal legs not crassate, pilose ; fifth joint sulcate beneath ; the last two joints decidedly flattened on the inner side.

Lithobius sexdentatus, sp. nv.

Prosternal teeth, 3 + 3. Ocelli, 19–24, arranged in 4 rows. Antennal articles, 20–21. Coxal pores, 4, 4, 5, 4–4, 5, 5, 4, or 17–18 ; round. Spines on the first pair of legs, 1, 3, 1–2, 3, 1 ; on the penultimate pair, 1, 3, 3, 2 ; on the anal pair, 1, 3, 2, 0. Anal and penultimate legs each armed with a single claw. Claw of female genitalia entire. Slightly robust, dark chestnut ; head darker. Head subrotundate ; longer than broad. Antennæ short, pilose, articles long. Anal legs slightly crassate Length, 12 mm.

From the Bad-lands of Sioux Co.

L. Celer, Boll.

L. forficatus (Linn) Leach.

Neolithobius mordax, (Koch) Stux.

Scutigera forceps, (Raf.) Latr.

Digitized by Google

CORRESPONDENCE.

PARNASSIUS CLODIUS AND P. SMINTHEUS.

SIR,—Good specimens of these species are generally easily separated, but occasionally specimens are taken the identity of which it is difficult to decide. Mr. C. de Blois-Green, of Victoria, B. C., who has taken both specimens in large numbers, has drawn my attention to a character which he finds reliable in all instances. This is that in *Clodius* the antennæ are uniformly black, whilst in *Smintheus* they are ringed with white. Of course, when the abdominal pouch is attached, there is no difficulty in separating the female of *Clodius* with its large pouch from *Smintheus* with its small keel-shaped appendage. The value of these abdominal pouches has been well-worked out by Mr. H. J. Elwes in an exhaustive paper published in the Transactions of the Entomological Society of London. Some specimens received from Mr. de Blois-Green were sent to Dr. H. Strecker, and his opinion asked as to the value of the character based on the colour of the antennæ. His reply, which I think will be read with interest by lepidopterists, is as follows:—

"Your letter and the remnants of the *Parnassius* received. The latter are only *Clodius*, of the form found in the State of Washington and western British Columbia; those further south (California) are not as large nor as brightly coloured, as a general thing. Your correspondent is right in laying stress on the black antennæ. *Clodius* belongs to a group and is allied to some sub-group having black antennæ and large pouches. They embrace *Nordmanni*, from Armenia; *Clarius*, from W. Siberia; *Eversmanni*, from Alaska and Siberia; *Felderi*, the Amoor; *Mnemosyne*, Germany and Switzerland, etc.; *Stubendorfii*, Siberia; and *Glacialis*, Japan; whereas *Smintheus* has white-ringed antennæ, and its allies, distinguished further by the keel-shaped pouch, are *Apollo*, Germany; *Hesebolus*, Mongolia, etc.; *Nomion*, Siberia; *Jacquemonti*, Himalayahs, etc., with white-ringed antennæ also; but there are sub-groups allied to these with the same keel-like pouch as *Apollinus*, Tartary; *Honrathi*, Turkestan, etc., that have all black antennæ, so there is no rule without an exception. Our *Parnassius*, according to my views, are but three species:—

1. *Smintheus*, Dbldy—Hew.
2. *Clodius*, Men.
3. *Eversmanni*, Men.

Digitized by Google

All the others, such as *Thor*, *Menetriesii*, etc., are but varieties or aberrants. It would be easy to make fifty such species of *Smintheus* alone, if you took them at various altitudes and locations. Some butterflies, as, for instance, *Papilio Turnus*, of which I have great giants from North Carolina, Georgia, etc., expanding 5½ inches, while others from the White Mountains spread only 2½ inches, and there are all sorts of shades of yellow, orange, brown and black, and yet who would think of making a dozen species of these? I notice that Mr. W. H. Edwards includes *Par. Nomion* in our fauna. I think somehow he must be mistaken, unless possibly it was caught in Alaska."

HERMAN STRECKER."

Feeling sure that the above letter will be of interest to many of our readers, I have obtained Dr. Strecker's permission to publish it.

JAMES FLETCHER, Ottawa.

UNIDENTIFIED BOMBYCIDS.

SIR,—Messrs. Dyar and Neumoegen have struck a snag in their work, according to their statement in CAN. ENT. for May, 1893. I am glad that I am able to help them over one part of it. Of the "unidentified names," *Saligena personata* has been long since referred as a synonym of *Raphia frater*, and I am able to confirm the correctness of the reference. So *Edema obliqua* has been proved a noctuid, and an *Arzama*. As *Sphdia* or *Arzama obliquata*, it is a well-known insect. Messrs Neumoegen and Dyar are following Mr. Kirby's use of generic terms very closely. It would be a matter of some interest if they would inform us whether, in the case of Hübner's Tentamen, they have independently concluded that it should be adopted, or whether they simply follow Mr. Kirby without original investigation. So few of the working entomologists have accepted the Tentamen as authority, that it is not impertinent to ask why they have joined the minority. JOHN B. SMITH.

PROF. C. H. TYLER TOWNSEND

has been appointed Curator of the Museum at the Institute of Jamaica, in place of Mr. T. D. A. Cockerell, who has recently resigned on account of ill-health. Mr. Townsend's address is now Kingston, Jamaica, West Indies. We wish him much success and prosperity in his new position, and trust that he will continue to favour us with his valuable communications.

Mailed June 12th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, JULY, 1893. No. 7.

COMMENTS ON MR. VAN DER WULP'S RECENT DIAGNOSES OF NEW SPECIES OF MEXICAN PHASIIDÆ, GYMNOSOMATIDÆ, OCYPTERIDÆ, AND PHANIIDÆ.

BY C. H. TYLER TOWNSEND.

Mr. F. M. van der Wulp, the well-known Dutch dipterologist, has recently published, in the *Tijdschrift voor Entomologie*, vol. 35, pp. 183–195, short diagnoses of a large number of new species and several new genera of Mexican Tachinidæ sens. lat. Of these, there are 33 new species and 4 new genera which belong to the above four groups. Of such well-known and well-worked genera as *Trichopoda*, there are 4 new species; of *Hyalomyia*, 10 new species; of *Cistogaster*, 8 new species!

This material was received by Mr. van der Wulp from the editors of the Biologia Centrali-Americana, but too late to be included in his parts on the above groups, which had already been published. These forms are to be fully described at some future time in a supplement to the Biologia. No localities whatever accompany the short diagnoses.

I desire to offer the following notes on these species:—

PHASIIDÆ.

Trichopoda nitidiventris, ♂, is described as having the cilia of hind tibiæ black with yellow tips. This must be a quite divergent form, since it is the first one known with the tibial cilia varicoloured. It is also very distinct from the previously known forms in having the abdomen shining black with a rufous anus.

T. alipes, ♂, seems to be different from the described species, inasmuch as the tip of the wing, as well as the hind border, is broadly hyaline.

T. squamipes, ♂, seems quite distinct in its yellowish rufous scutellum and abdomen. *T. histrio*, Wlk. (*trifasciata*, Liv.), is the only species known to me with a yellowish, or other than a nearly black, scutellum.

Digitized by Google

T. nigripes, ♂ ♀, must be near *T. pennipes*. It is smaller, however, and the face and front are whitish instead of golden-yellow.

HOMOGENIA, nov. genus, v. d. W.

This genus must be closely allied to either *Xysta*, or *Phasia*. It is described as similar to *Trichopoda*, but with apical cell open, and cilia of hind tibiæ short and less conspicuous. This name is preoccupied (Homogenes) by Thomson in Coleoptera. I propose, therefore, that the genus be known as *Trichopododes*, from its close relationship with *Trichopoda*, as shown by its somewhat less ciliate hind tibiæ. Three species of it are described, from 7 to 11 mm. long. They are: *Trichopododes rufipes*, ♂ ; *T. latipennis*, ♂ ♀ ; and *T. nigroscutellata*, ♂.

Hyalomyia munda, ♂, seems distinct in the whole body being thickly covered with a yellowish-gray tomentum.

H. villosa, ♂, also seems distinct in its dense yellowish pilosity.

H. hebes, ♂, is apparently distinct in the shorter yellow pilosity.

H. ochriceps, ♂, seems very close to *H. æneiventris*, Will.

H. argenticeps, ♂, is also apparently very near *H. æneiventris*, Will. I do not see why the front in the above five male specimens is described to be as broad as, or broader than, the eyes, unless the anterior triangular portion of the front is meant. But this interpretation is precluded by the next five specimens being indicated as females, all of which are described as having the front trigonal and the eyes but little separated on the vertex. I do not know of any *Hyalomyias* which have the front as broad as the eyes,

H. nigrens, ♀, does not apparently differ much from *H. punctigera*. Twns., so far as can be gathered from the short description.

H. piceipes, ♀, may be a valid species.

H. mœrens, ♀, is quite near *H. purpurascens*, Twns. The wings, however, of the latter are not brown, but whitish.

H. umbrosa, ♀, is a similar but larger species.

H. umbrifera, ♀, is allied to *H. punctigera*, Twns.

GYMNOSOMATIDÆ.

Cistogaster ruficornis, ♂, seems to be *Gymnosoma filiola*, Liv., ♂.
C. melanosoma, ♀, is probably *C. pallasii*, Twns.
C. subpetiolata, ♀, seems only a variety of *C. pallasii*, Twns.
C. propinqua, ♀, seems very near *C. immaculata*, Mcq., ♀.
C. griseonigra, ♀, may be same as *C. occidua*, Walk., ♀.
C. ferruginosa, ♂, is probably *C. immaculata*, Mcq., ♂.
C. histicollis, ♂, is doubtless *C. occidua*, Wlk., ♂.
C. variegata, ♂, seems to be only a variety of preceding.

Digitized by Google

OCYPTERIDÆ.

Ocyptera signatipennis, ♂. is probably *Ocyptera euchenor*, Wlk.

XANTHOMELANA, nov. genus, v. d. W.

This genus must be very similar to *Ocyptera*, differing only by the curved, not angulated, fourth vein, and the shortly petiolate apical cell, with the petiole ending at the wing's tip. This name is also preoccupied (Xanthomelon, Mart., Moll., 1860), and may be changed to XANTHOMELANODES. Six species are described, from 4½ to 7½ mm. long. They are:—*Xanthomelanodes articulata*, ♂ ; *X. rubicunda*, ♂(?); *X. dorsalis*, ♂ ♀ ; *X. trigonalis*, ♂ ; *X. gracilenta*, ♂ ♀ ; and *X. anceps*, ♂.

PHANIIDÆ.

CLINOGASTER, nov genus, v. d. W.

This genus must bear a striking resemblance to *Hemyda*, differing almost wholly in the short petiolate, instead of open, apical cell, and in the fourth vein being bent at an angle. It belongs apparently in the *Ocypteridæ*, however, and not in the *Phaniidæ*, as indicated by the elongate and incurvate abdomen.

Clinogaster notabilis, ♂, type of the genus, must be very similar in size and appearance to *Hemyda aurata*.

PENTHOSIA, nov. genus, v. d. W.

This genus is erected by Mr. van der Wulp for *Scopolia satanica*, Bigot (Ann. Soc. Ent. Fr., 1888, p. 254). Mr. van der Wulp has been kind enough to send me a specimen of this species, labelled: "Omilteme, Guerrero, 8,000 ft. July. H. H. Smith." It is a well-marked genus, bearing much structural resemblance to *Ocyptera*, but differing at once in its well-formed palpi, and its intensely and evenly black colour. It should, I think, also be included in the *Ocypteridæ*. Both this genus and *Clinogaster* exhibit a closer relationship with *Ocyptera* than do any of the other American genera of *Ocypteridæ*, by virtue of their petiolate apical cell.

To sum up:

The above 4 new genera appear to be quite distinct and valid. The species of *Trichopoda* appear to be distinct from those previously described. The *Hyalomyias*, at least the most of them, are doubtless valid species. This is not to be wondered at, since the genus *Hyalomyia* is rich in forms. It is more remarkable, however, that 4 new species of *Trichopoda* should turn up at this late day, and in a single collection.

Digitized by Google

When we come to the genus *Cistogaster*, and find 8 new species, we may well be astonished. This genus has never before been turned up in Mexico, or anywhere in tropical America. Though most numerous in individuals in most parts of the United States, there were heretofore but 3 species to be distinguished, and these might easily all be considered but forms of a single variable species. Bearing this in mind, we are wholly unprepared for such a sudden increase in the number of species, and may well doubt their validity. With the single exception of the first species (*C. ruficornis*), they are probably all referable to the three already known species. From the description of *C. ruficornis*, I cannot resist the conclusion that Mr. van der Wulp has mistaken *Gymnosoma filiola*, Liv., for a *Cistogaster*.

Of course it is difficult, and to a certain extent uncertain, to judge of these forms from the brief diagnoses alone that have so far appeared. For this reason I feel called upon to delay the publication of Part I. of the Monograph of North American Tachinidæ, referred to in *Psyche*, Jan., 1893, until the Biologia supplement appears giving fuller descriptions of these species with drawings.

If any of the above comments prove to be erroneous in their conclusions, I shall be most happy to amend them.

DESCRIPTION OF THE GRUBS OF CHRYSOMELA EXCLAMATIONIS.

BY C. H. TYLER TOWNSEND.

This species is quite common in New Mexico, where it feeds on the native sunflower (*Helianthus sp.*). On August 7, 1892, at Belen, N. Mex., I found the native *Helianthus annuus* badly infested with the adults and numerous light green grubs of this species, which were eating the leaves extensively. From these grubs the following description is drawn :—

Larva (about full grown).—Length, 5½ to 7 mm.; greatest width, 4 to 4½ mm.; greatest thickness, 3 to 3½ mm.; width of prothoracic segment, 2 to 2½ mm.; of head, 1½ mm. Colour wholly light green, except head and legs, which are slightly tinged with brownish; eyes, antennæ and jaws, brown. Shape subpyriform, curvate, very strongly convex dorsally; slightly concave ventrally in lateral profile, but a little convex in longitudinal profile;

Digitized by Google

tapering anteriorly to head, stout posteriorly, coming suddenly to a point at anal extremity. Transversely wrinkled, both above and below. Consisting of thirteen segments, head chitinous, other segments fleshy, the prothoracic segment hardly less so. Nearly naked, clothed only with a few very sparsely distributed hairs, somewhat more numerous on the prothoracic segment and head. Head semi-circular in outline from above, not retracted, narrower than prothoracic segment; second, third, fourth, and fifth segments each successively wider than its predecessor, and increasing at about the same rate; segments 6 to 8 about same width, a little wider than 5; 9 to 12 narrowing successively, each with greater rapidity than its predecessor; 13 very small. Prothoracic segment a little longer than head; segment 3 (in wrinkled condition of alcoholic specimens) about two-thirds length of second, the following segments increasing very slightly to the somewhat greater length of 6 to 9; 10 and 11 successively a little shorter; 12 and 13 very short, of about equal length, 13 bearing a blunt subbifid anal proleg. All the segments with a few short hairs on lateral edges, varying in number usually from 3 to 5, second segment and head with more. Eyes represented by six prominent brown or blackish, often glistening, simple eyes on each side of the head, four of them arranged in a transverse diamond just posterior to antenna and a little removed inwardly from edge of head; the other two situated on edge of head, more separated, one ventrad of the antenna and the other ventrad of the upper four. Antennæ small, situated in an excavation and somewhat sunken, 3-jointed; first joint stout, cylindrical, hardly as long as broad; second joint less than one-half the diameter of first, not as long: third joint nearly as wide as second, hardly as long. Labrum twice as wide as long, front border hollowed out, bearing two bristles on its dorsal surface, clypeus appearing as a long transverse narrow strip posterior to labrum. Mandibles stout, 5-toothed on the blunt apical portion. Maxillæ well-developed. Maxillary palpi 4-jointed, first joint short; second a little shorter than first, but nearly same diameter; third longer than first, narrower than second, cylindrical; fourth conical, almost as long as third, not as wide at base as third, and tapering evenly to a point. Labial palpi 2-jointed; basal joint stout, tubercular, hardly as long as wide, subcylindrical; the second joint conical, hardly as wide at base, and hardly longer than basal joint. A spiracle (the mesothoracic) on lower anterior portion of third segment; 5 to 12 with a spiracle on lateral portion dorsad of the lateral

Digitized by Google

ridge which separates the tergum from the venter on these segments; the thoracic segments extend farther ventrad on the sides. Legs apparently 4-jointed, corneous, first two joints more or less amalgamated, fourth shorter than third, terminated by a hooked claw.

Described from many alcoholic specimens. Belen, N. Mex. August 7.

A LIST OF SPECIES OF DIPTERA FROM SAN DOMINGO.

BY S. W. WILLISTON, LAWRENCE, KANSAS.

Some years ago I received a small collection of diptera from San Domingo, made by Mr. F. Frazar, a list of the species of which it is composed I herewith give. Hitherto scarcely two score species have been recorded from the island. The habitats followed by an exclamation point are given from specimens which I have examined:—

1. *Odontomyia*, sp.
2. *Cyphomyia*, sp.
3. *Lepidoselaga crassipes*, Fabr. South America! Mexico! Cuba.
4. *Chrysops costatus*, Fabr. South America! Cuba.
5. *Chrysops Frazari*, Will.
6. *Tabanus parvulus*, Will.
7. *Tabanus fenestra*, Will.
8. *Plesiomma lineata*, Fabr. St. Thomas.
9. *Laphria ruficauda*, Williston. Cuba!
10. *Andrenosoma chalybea*, Will. Cuba!
11. *Atonia Mikii*, Will.
12. *Proctacanthus rufiventris*, Maco. Honduras. Porto Rico.
13. *Erax*, sp.
14. *Ommatius vitreus*, Bigot.
15. *Psilopus chrysoprasius*, Walker. Cuba! Brazil! Porto Rico.
16. *Plagioneurus univitattus*, Loew. South America! Cuba.
17. *Microdon pulcher*, Will.
18. *Mesogramma aurulentum*, Will.
19. *Syrphus simplex*, Loew. Cuba.
20. *Ocyptamus dimidiata*, Fabr. Brazil! Mexico!
21. *Ocyptamus latiusculus*, Loew. Cuba.
22. *Ocyptamus fasciatus*, Roeder. Porto Rico.
23. *Eristalis atrimanus*, Loew. Cuba.
24. *Eristalis albifrons*, Wied. Brazil! Mexico! United States! Port Rico.
25. *Eristalis hortorum*, Fabr.

Digitized by Google

26. *Volucella obesa*, Fabr. Cosmopolitan.
27. *Pteroptila cincta*, Drury. Jamaica.
28. *Phrissopoda praeceps*, Fabr. South America.
29. *Lucilia*, sp.
30. *Compsomyia macellaria*, Fabr. Brazil! Mexico! United States!
31. *Dexia*, sp.
32. *Morinia*, sp. nov.
33. *Limophora*, sp.
34. *Belvosia Van der Wulpi*, Will.
35. *Blepharipeza leucophrys*, Wied. Brazil! United States! Porto Rico.
36. *Jurinia*. Two species.
37. *Jurinia apicifera*, Walker. United States!
38. *Trichopoda pennipes*, Fabr. Brazil! United States!
39. *Trichopoda*, sp.
40. *Sipedon macropus*, Walker. Cuba. Jamaica. Porto Rico.
41. *Calobata lasciva*, Fabr. South America! Cuba! United States! Porto Rico.
42. *Notiphila*, n. sp.

Fem. Flavo-cinerea, facie flava, antennarum articuli tertii basi rufa, thoracis dorso vittis quinque humerisque brunneis; abdomen brunneum vitta media maculisque cinereis; pedes nigri, tibiis tarsisque posterioribus et tibiarum anticarum basi apiceque luteis.

FITCH'S TYPES OF N. A. MEMBRACIDÆ.

F. W. GODING, M. D., PH. D., RUTLAND, ILLINOIS.

During a recent visit to the city of Washington, through the kindness of Prof. C. V. Riley and his courteous assistants, I had the pleasure of examining typical examples of some of the Membracidæ described by Dr. Asa Fitch, the labels being in Dr. Fitch's own handwriting. Each specimen is numbered to agree with those given in the doctor's manuscript note-books, now in the possession of Dr. Riley and the Boston Society of Natural History. No. 11793 and 59782 are labelled *Telamona acclivata*, Fh.; on the label he states: "like cristata, Fm., but hind lobe rounded, not angular." This is *Heliria cristata*, Fm., ♀. No. 3109 is the typical example of *Telamona querci*, Fh. It is usually seen in collections labelled *monticola*, Fab., on whose authority I do not know. It is much smaller than that species and entirely different. I believe it to be a good species. It is a male. No. 2132, labelled *Atyta irrorata*, Mels., is *Telamona*

Digitized by Google

irrorata, Godg., described first in Bul. Ill. Lab. Nat. Hist., Vol. 3. It is the only description ever published. No. 2133, labelled *Telamona concava*, Fh., ♀, and apparently identical with No. 12727, a male. There is a beautifully coloured ♀ of this species in the collection of the Department of Agriculture, light and dark blue-green.

No. 3907 is *Telamona tristis*, Fh., ♀, and another smaller example doubtless the same. With these is a *coryli*, Fh., ♂, which I believe to be the same species as suggested by Van Duzee.

No. 2152, labelled *Ledra perdita* and *capra*, Mels., is *Centruchus Liebeckii*, Godg.

No. 6276, is *Microcentrus caryæ*, Fh., ♂, and No. 1878 is ♀. This species was erroneously referred, by Fitch, to the genus *Uroxiphus*. The female is about one-fourth larger then the male.

No. 6926 is labelled *Cyrtosia fenestrata*, Fh., ♀. It is the only example I have seen that agrees with Fitch's description "tip of the thorax reaching beyond the terminal cells of the elytra." In all the examples in my own collection the tip of prothorax barely reaches the terminal cells, while Mr. E. P. Van Duzee, a careful student and successful collector, informs me that all the specimens he has seen agree with my own.

No. 11764 is labelled *Cyrtosia fuliginosa*, ♀, described and figured in Emmon's valueless work on the Insects of New York. The dorsum is dark-brown with an arcuated yellow stripe on each side; legs yellow.

No. 3038 is labelled *Cyrtosia discoidalis*, ♀; also No. 4837. Described in Emmon's work. No. 11763 is *Cyrtosia pallidifrontis* of the same author and doubtless the same.

No. 11777 = *Cyrtosia maculifrontis*, and No. 4536 = *Cyrtosia cinereum* of the author's.

There are many other examples of this genus [*Cyrtosia* being preoccupied, I have given to this genus the name *Cyrtolobus*] in the collection under various manuscript names, such as *nigra*, *punctifrontis*, *tricineta*, etc., which may be distinct species, but I am inclined to the opinion that they are variations of a single species and that species may be *Vau* of Say.

There are several examples of the genus *Ophiderma* in the collection, under the manuscript names *nigripennis*, *arquata*, *rectineura*, *flaviguttula*, *bicincta*, *nigriventris*, *dimidiata*, *columbis*, etc., which I believe are variations of not more than two species.

In the collection are to be found examples of *Platycotis 4-vittata*, Say, = *4-lineata*, Germ. It is a dimorphic species, as has been proven by Prof. Riley and Mr. Ashmead, the anterior horn being present in the one and wanting in the other. Both forms are represented in the Fitch collection and in my own cabinet.

Digitized by Google

NORTH AMERICAN THYSANURA.—II.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The genus *Japyx* has been of particular interest because of the apparent absence of rudimentary abdominal appendages. One American * writer says very decidedly, "*Japyx* has none"; a well-known English † writer considers these appendages as "represented by mere groups of stiff hairs." The presence of these appendages was indicated as early as 1869, by Brauer, ‡ in his description of *Japyx gigas*. In 1889 there appeared a very important paper by Haase §, in which the rudimentary appendages are distinctly shown. These appendages can easily be seen in either of the species described below.

JAPYX SUBTERRANEUS, Pack.

1874, *Japyx*, Packard, Amer. Nat., VIII., 501.

Head quadrangular, not broader than long. Antennæ about thirty joints. Prothorax narrower than the head, truncate in front. Abdomen gradually broader behind, segments marked on each side with whitish dots, arranged in the form of a figure six; segments one to six rounded at the sides, the seventh slightly emarginate behind, posterior angles produced, not spinate, eighth subequal to the seventh, longer than the sixth, slightly emarginate behind, sides straight; ninth segment one-third the length of the eighth, posterior angles not produced; the tenth segment and forceps subequal in length, together equal in length to the four preceding segments. Right arm of the forceps broader than the left, with a stout tooth on the inner margin near the middle; in front of this tooth the inner margin is convex with four small tubercles, adjacent to the tooth, beyond the tooth the arm is concave and armed with tubercles to the apex. The left arm is broadest at base, becoming gradually narrower till a little beyond the middle, where there is a large tooth-like tubercle, in front of this tubercle the arm is concave and armed with seven to eight small tubercles; beyond the tubercle the arm is convex and armed with very small tubercles.

* Packard, Standard Natural History., II, 1884, 137.

† Lubbock., Monog. Collem. and Thys., 1873, 205.

‡ Brauer, Verh. Zool.-bot. Ges. Wien, XIX., 1869, 557.

§ Haase, Die Abdominalanhange der Insekten mit Berucksichtigung der Myriopoden, Morphol. Jahr., XV., 1889, 330-435; pls. XIV.-XV.

Digitized by Google

Length, 12–14 mm.; length of the antennæ, 4 mm.; length of the abdomen, 8 mm.; length of the last abdominal segment and the forceps, 2 mm.

Habitat: Kentucky (Packard), District of Columbia (Nathan Banks).

JAPYX AMERICANUS, sp. nov.

Head transverse, broader than long. Antennæ twenty-four jointed, segments one to five cylindrical, subequal; the following segments thicker, spherical. Prothorax nearly as broad as the head, concave in front. Abdomen gradually broader behind, segments immaculate. Segments one to six rounded in the sides behind; the seventh emarginate behind, posterior angles produced into stout spines, pointing inward; the eighth segment equal to the seventh, subequal to the sixth, very slightly emarginate behind, posterior angles slightly produced, not spinate; ninth segment one-fourth the length of the eighth, posterior angles slightly produced; tenth segment and forceps subequal in length, together equal to the four preceding segments. Right arm of the forceps scarcely broader than the left, with two large tubercles on the inner margin, one just before the middle and the other beyond it; in front of the larger tubercle the inner margin is convex with five smaller equidistant tubercles, between the larger tubercles the inner margin is straight with six equidistant tubercles, beyond the last tubercle the inner margin is concave with many small tubercles. The left arm is broadest at base, gradually tapering to the apex; at one-third of the length from the base on the inner margin there is a large tooth, in front of and adjacent to this tooth are three smaller tubercles, which are as large as the larger tubercles of the right arm and with their apices broadly rounding; beyond the tooth the inner margin is convex with nine feebly marked tubercles, giving a crenulated appearance; beyond these tubercles the inner margin is simple.

Length, 14 mm.; length of the antennæ, 5 mm.; length of the abdomen, 10 mm.; length of the last abdominal segment and forceps, 3 mm.

Habitat: Olympia, Washington State.

For the discovery of this interesting species science is indebted to Mr. Trevor Kincaid, of Olympia, Washington.

A third species of *Japyx* has been described from Mexico. It can be distinguished by its longer antennæ, consisting of from forty-five to forty-eight segments.

Digitized by Google

A NEW ASILID GENUS RELATED TO ERAX.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

Among the species heretofore referred to the genus *Erax* is a small group in which the first submarginal cell is divided by an oblique cross vein into two cells. The venation is similar to that of the genus *Promachus*, except that the foremost of the two apical submarginal cells is shorter, and the third vein curves forward to the costa before the apex of the wing, instead of curving backward to the hind margin beyond the apex. The examination of quite a large series of specimens belonging to this group proves that the characters above mentioned are constant, and as the genus *Erax* already contains a large number of species, it is desirable to separate as a new genus those species possessing these characters. For this group I propose the name *Efferia*, and would further characterize the genus as follows :—

Efferia, n. gen.—Third joint of antennæ provided with a distinct naked, terminal style ; wings having three submarginal and five posterior cells, the marginal, fourth posterior and anal cells closed ; third vein terminating in the costa before the tip of the wing ; front tibiæ destitute of a claw at the apex ; ovipositor of the female compressed and destitute of a circlet of spines at the tip.

Two species belonging to this group have been described from North America : *anomalis*, Bellardi (Saggio, II., 32) and *completus*, Macquart (Dipt. Exot., I , 2, 117). The last-named species has not been identified. My collection contains three apparently undescribed species, which, with *anomalis*, may be separated as follows :—

1.—Thorax destitute of a median longitudinal crest of nearly erect hairs 2
Thorax provided with such a crest ; bristles of the palpi black..... .....*rava*, n. sp.

2.—Bristles of palpi, mystax and scutellum white..... 3
Bristles of palpi, scutellum, occiput above, and several in lower part of mystax, black.....*anomalis*, Bell.

3.—Abdomen silvery-white pollinose, and with rather long white pile parted in the middle and directed outward.....*candida*, n. sp.
Abdomen grayish-brown pollinose, and not with pile as above described ....*pernicis*, n. sp.

Efferia pernicis, n. sp., ♂. Black, the base of the tibiæ red. Pile and bristles of entire head yellowish-white, the pollen yellow. First antennal

Digitized by Google

joint nearly twice as long as the second and slightly longer than the third, style two and a-half times as long as the third joint. Pile of prothorax long, white, that of mesothorax very short, sparse, black, not forming a crest, that on the posterior part longer and partly white; dorsal stripes and spots indistinct, grayish-black; pile of pleura, legs and scutellum white, that on the abdomen short, sparse, not parted in the middle where it is largely black, elsewhere white; pollen of abdomen nearly uniform grayish-brown. Inner side of the front and hind tibiæ next the tips, and the under side of their first two tarsal joints, densely beset with rather short golden-yellow pile. Halteres pale brown. Wings hyaline, small cross-vein at middle of the discal cell, base of third submarginal cell at last third to sixth of distance between small cross-vein and apex of discal cell; costa not enlarged. Hypopygium shining black, but slightly wider near the apex than at the base, equal in length to the fifth and sixth abdominal segments united, its pile white, more dense below at the base.

♀ same as the ♂, except the genitalia; ovipositor slightly longer than the fifth, sixth and seventh abdominal segments taken together.

Length, 20 to 24 mm. Los Angeles and San Diego Counties, Cal. Two males and two females.

Efferia rava. n. sp.—♀. Same as *pernicis*, with these exceptions; Bristles of front, of upper part of occiput, on under side of antennæ, in lower part of mystax, and those of the palpi, black. Thorax with a median crest of rather long and nearly black hairs; the fan-like row of hairs in front of the halteres mostly black, pile of scutellum also black. Ovipositor but slightly longer than the sixth and seventh abdominal segments. Wings yellowish-hyaline.

Texas. A single female (Morrison).

Efferia candida, n. sp., ♂. Black, bases of tibiæ red. Pile and bristles of entire head white, a few bristles of the occiput sometimes black, pollen of head silvery-white. Pile of thorax short, sparse, black, not forming a crest, that behind and on the prothorax longer and mostly white; stripes and spots of thorax distinct, black. Pile of pleura, legs, scutellum and abdomen white, that on the abdomen rather long, parted in the middle and directed outwardly; abdomen nearly uniformly silvery-white pollinose, destitute of black spots; hypopygium shining black, but slightly wider near the apex than at base, slightly longer than the fifth and sixth abdominal segments taken together, its pile white. Front and hind tibiæ within next the tips, and under sides of their first two tarsal

Digitized by Google

joints densely short golden-yellow pilose. Wings hyaline, small cross-vein at middle of discal cell, base of third submarginal cell at last fifth of distance between small cross-vein and apex of discal cell; costa not enlarged. On the anterior part of the second abdominal segment are many rather large, transversely-elliptical punctures, and similar punctures also occur on some of the other segments. Antennæ similar in structure to those of *pernicis*.

♀ same as the ♂, except that the pollen of the abdomen is darker, and the pile is shorter and sparser; ovipositor as long as the fifth, sixth and seventh abdominal segments taken together.

Length, 20 to 25 mm. Los Angeles County, Cal. Six males and four females.

NOTES ON COLLECTING SOME OF THE SMALLER SESIIADÆ IN THE LONDON (ENGLAND) DISTRICT.

The one most commonly met with is *S. tipuliformis*, and is to be found sunning itself on the leaves of the currant bushes at the time when the fruit is about two-thirds grown, and on a bright sunny morning about 10 o'clock, or afternoon about 4 o'clock, one can easily take from six to twelve in one or two hours. Once I found them assembling, and took some thirty or forty in a very short time. It is a little difficult to procure the larvæ, as they feed in the two-year-old wood, and, as this is the fruit-producing part, it is better not to cut it while the owner is about, and when you can cut, I have found so many blanks that the bushes have suffered more than the gain warranted.

The next species commonly met with is our red-banded one, *S. myopaeformis*, feeding in the bark of apple trees (about six feet from the ground), and can generally be found in gardens where *Tipuliformis* is found. I have never seen this moth at rest, and though one can generally count on taking several in a morning, one must watch the trunks of the trees and find them flying round and round, evidently for depositing eggs; cutting out the larvæ without doing much damage to the tree is hard, as they feed just under the bark.

Our next commonest one is *S. culiciformis*. For this we must go to the woods where birch is common; so, taking the train down to Croydon, ten miles (about the end of April), a two-mile walk brings us to West Wickham Wood, one of our best in the South London district. We go through it till we find a part which was cut down two winters back;

Digitized by Google

here, having found some nice looking birch stumps with frass showing, we set to work with a saw to saw off the sides, and so find we have secured one or two larvæ or pupæ, and in a good afternoon's work may perhaps obtain twenty. These we take home and put on wet moss to prevent drying up, and with care may in about six weeks breed a good many. I have found putting them under a bell glass a good way. I have never taken this insect on the wing.

The next, *S. formicaeformis*, with its pretty claret-coloured wings, we find flying in the sun along the sides of the roads which intersect our osier beds in the Mitcham district (about eight miles out). This species seems on the wing all the day, and fifteen or twenty is a fair catch. The larvæ can be cut out of the osiers about April, but it is very risky, as the basket makers have a decided objection to their osiers being cut.

S. chrysidiformis, the handsomest of all our smaller Sesiiadæ, with its bright scarlet wings, was, until some twelve years ago, most rare, fetching as much as two and three pounds per pair, but about that time they found out how to take the larvæ. Starting from the London Bridge station, on the S. E. R., we take tickets for Folkestone (town station). Arriving there after about two and a-half hours' run, we turn towards the Warren (a sort of undercliff running along the shore for about three miles), and after a mile's walk we get on to the slopes closest to the sea. Having brought a good, sharp, two-inch chisel with us, we look round for roots of dock and sorrel; the former we find are very scarce, having been cleared off by collectors; the latter, however, are still common, and having selected a good strong one dig it up, and scraping part of the root away see signs of workings. We put the root into a small sack we have provided and then search for more. In the course of a day we get a nice lot together, and upon our arrival home plant them into boxes. As it is only April, and the imago will not be out till June, there is now nothing else to do but to keep them watered and cover over with muslin till about the end of May. One year, from three days' work in Folkestone Warren, I bred about 150 fine imagos.

S. cynipiformis, feeding in oak, is said to occur in Hyde Park, but I have never been able to find it there. However, I have obtained the larvæ commonly at Tilgate in early May by finding the trunks of large oaks which have been cut down two winters previous, then ripping off the bark the larvæ are found feeding in it. In England the trees are cut off only four or five inches from the ground, and the moths seem to prefer

Digitized by Google

these to the growing tree. There, however, appears plenty of sap to support the larvæ till full grown. The only trouble, having got the larvæ, is to prevent drying up till time of emergence.

S. ichneumoniformis. I have never bred and have only taken it very sparingly by sweeping the herbage along the edge of cliff at Eastbourne and Ramsgate. The most I ever took in a day was five.

S. sphegiformis (one of our rarest ones, which is taken every year), has to be cut out of the alder. About March we take train for Three-Bridges Station, thirty miles out on the Brighton line. Arriving there we are soon on the ground and examining the alder stems from one to four inches thick. When we find workings which would denote larvæ in the second year, we saw off just below and then again about eighteen inches higher, and if very lucky we may get from ten to thirty sticks in a day. These have to be kept on moist moss in tin boxes till the middle of June, when the moth appears. Having a nice ♀ quite fresh, we are off by the first train, and having put her in a collar box with muslin on each side, we hang it to a bough and sit down and wait events. Perhaps nothing for the first half hour, but what is that buzzing in front of the box? We get up quickly and see it is a fine ♂. We need no net; he is so intent that we hold our bottle just behind him and bottle him on the wing. By this means I took twenty-three in one day. The curious part is, I never saw them coming until they were quite at the box hovering, and also that an insect so quick on the wing should not fly off, even when the bottle is as it were all round it and only the cork to put on.

S. scoliaeformis was taken out of birch fairly commonly at Llangollen, Wales, some twenty years back, but was quite worked out then, and for some fifteen years no one had taken it. However, last year in Scotland I hear it has been taken fairly commonly.

S. philantiformis was added to our list only some ten years back. It was found by accident feeding in the common thrift on the sea coast in the west of England, but I have never taken it.

S. vespiformis and *S. andreniformis*, the two remaining of our smaller Sesiiadæ, are of the greatest rarity, and have only been taken singly.

Regarding *Tipuliformis*, in 1874 and 1875 I took and saw several in Mr. B. Gibb's garden, St. Catharine street, Montreal, among the currant bushes, and I should think it would be found in any of our old town gardens now.

LACHLAN GIBB.

Digitized by Google

A SUGGESTION AS TO THE IDENTITY OF CYCNIA DUBIA, WALKER.

BY HARRISON G. DYAR, ROXBURY, MASS.

In Vol. XXII., p. 120, of CAN. ENT., Prof. Smith calls attention to the fact that the above name awaits identification, and says: "There should be no difficulty in identifying this species, should it turn up." The moth was described by Walker as Cycnia, referred by Grote and Robinson to Phragmatobia, and lastly by Kirby to Estigmene (= Leucarctia). It has occurred to me that this form has already been turned up, and by Mr. Bruce, as described in Entom. Amer., Vol. III., p. 140, where it was shown to be a form of *Spilosoma virginica*. Compare the following descriptions:—

1. By Walker. "Female. Pale brown. Antennæ and legs with whitish tomentum. Thorax fawn colour, whitish behind. Abdomen somewhat ferruginous, with three stripes of black spots. Wings with two oblique, incomplete, indistinct, brown bands, composed of blackish spots. Forewings with whitish veins. Length of body, 5 lines; of wings, 16 lines. Hudson's Bay."

2. By G. & R. "Wings semi-translucent, brown or mouse colour; veins on both wings whitish above; eyes margined narrowly with white; legs shaded with whitish outwardly; abdomen with three rows of brown spots."

3. By Bruce. "Head, body and legs sooty brown, small black dorsal spots on body; all the wings brownish mouse colour. The veins on forewings distinctly white."

Mr. Bruce adds:—"If my friend had not preserved the eggs, and I had not reared the larvæ, this would certainly have been named as a new species, and would have been a standing puzzle to entomologists." If my surmise be correct, this has taken place.

C. dubia may be provisionally referred as follows:—

SPILOSOMA VIRGINICA, Fabr.

var. DUBIA, Walk.

1856—Walk., C. B. Mus., III., 682, *Cycnia*.

1868—G. & R., Tr. Am. Ent., Sc., II., 72, *Phragmatobia*.

1887—Bruce, Ent. Amer., III., 140, *Spilosoma*.

1890—Smith, CAN. ENT., XXII., 120, *Phragmatobia*.

1892—Kirby, Cat. Lep. Het., I., 227, *Estigmene*.

Digitized by Google

A NEW LAC-INSECT FROM JAMAICA.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

The lac-producing Coccidæ are usually referred to the genus *Carteria*, Signoret, but as this name is pre-occupied in Protozoa, Signoret (Bull. Soc. Ent. Fr., 1886) substituted for it the term *Tachardia*. The known species referable to this genus are five, namely :—

1. *Tachardia lacca* (Kerr.) India, on 43 species of plants of 18 natural orders (Watt, Dict. Econ. Prod. India, II., 1889, p. 409-412); British Guiana, on *Erythroxylon (Timehri*, Dec. 1890, p. 308).

2. *Tachardia larreæ* (Comst.), Arizona, on *Larrea*. (Rep. U. S. Dept. Agr., 1882).

3. *Tachardia mexicana* (Comst.), Tampico, Mexico, on *Mimosa*. (Rep. U. S. Dept. Agr., 1882).

4. *Tachardia melaleucæ* (Maskell), Australia, on *Melaleuca*, &c. (Tr. N. Z. Inst., 1891).

5. *Tachardia acaciæ* (Maskell), Australia, on *Acacia*. (Tr. N. Z. Inst., 1891).

To these may now be added a sixth, as follows :—

6. *Tachardia gemmifera*, n. sp., Kingston, Jamaica, on *Chrysobalanus icaco*, Linn.

Some months ago, Mr. H. Vendryes directed my attention to a Coccid which was damaging a Coco Plum in his garden, and kindly gave me some twigs with many scales upon them. These were evidently referable to a new *Tachardia*, which I call *gemmifera*, on account of the ruby-like prominence on the dorsum of the scale. The female scales (if the covering of lac can properly be so called) are subglobular, shiny, crimson-black, with a crimson ruby-like prominence on the centre of the back, best seen in somewhat immature examples. There are also one or two dorso-lateral prominences, more or less obscure. Sides with 4 or 5 keel-like folds. There is a conspicuous subdorsal aperture.

Length of scale, 5 mill.; diam., 5 mill.; alt., about 4 mill.

The scales are extremely hard, but will fracture if sufficiently pressed; sides of scale crimson by transmitted light.

The lac when heated melts to a substance about the colour of guava jelly, which turns crimson on the application of caustic soda: this colour-change is most marked.

The *female* is very broad oval, almost circular, posteriorly bluntly angled. On breaking open a scale, it is seen not to be completely filled

Digitized by Google

by the body of the female. In the cavity, besides the ♀, is a quantity of white secretion, breaking into short strap-shaped fragments. None of this appears externally. There are also more hair-like white fragments, some of which may be seen protruding from the produced tubular organs. This white secretion is no doubt analogous to the ovisac, as in it I found larvæ.

The *male scale* is cylindrical, rather over 1 mill. long, dull dark crimson. There is an anterior dorsal ridge, leading to a mid-dorsal swelling. Hind end truncate. Front end with a largle hole, where the ♂ has escaped; or, when the ♂ has not escaped, this is covered by a flat lid or cap.

The *larvæ*, as observed in numbers on the bark of the twig, are crimson, elongate, with the segmentation distinct; sides with a longitudinal furrow. Caudal hairs about ⅔ length of body, free from secretion. These hairs arise some distance apart, and immediately caudad of each is a small elongated process or tubercle; between these, and terminating the body, is a short, white, opaque caudal stylus, which is distinctly bifid, and no doubt consists of the anal hairs covered by secretion. This arrangement is suggestive of *Dactylopius*.

The last joint of each antenna bears two long hairs, longer than the whole antenna; this is also the case with the larva of Maskell's *Carteria melaleucæ*.

The claws have short knobbed digitules; and the tarsus presents the usual pair of knobbed hairs, which are very long. The tibia seems quite as long as the femur, and the tarsus is *very* little shorter than the tibia. There are some short stiff hairs about the base of the legs.

Maskell remarks (Indian Mus. Notes, Vol. II., No. 1, p. 62), on the almost invariable rule that in larval Coccidæ the tarsus is longer than the tibia. This, however, is not the case in *Erischiton cajani*, Mask.; and a further exception is presented by *Tachardia*, in which, at least in *T. gemmifera* and *T. melaleucæ*, the tibia of the larva is slightly longer than the tarsus.

On placing some of the ♀ scales in soda, I found fragments of a Chalcidid parasite, which seems to belong to the genus *Aphycus*. The antennæ present the following characters: Scape long, with an apparent false joint near its base, its upper part zoned with brown; pedicel about twice as long as broad; the following 6 joints moniliform, increasing regularly in size, the first three joined together, the last three more separated and bearing whorls of hairs. Club large, brown (the joint just

Digitized by Google

before it is colourless), and consisting of three joints. The middle tibia has two brown zones, and a large thick spur. The ovipositor projects but slightly beyond the abdomen, and bears on each side of its tip a small brush of hairs.

Tachardia gemmifera must, I think, be regarded as an injurious insect, since it affects the Coco Plum rather seriously. The lac is so small in quantity that it would probably not pay to collect and prepare it.

Institute of Jamaica, Kingston,
Jamaica, Dec. 27, 1892.

NOTES ON TAXONUS NIGRISOMA AND T. DUBITATUS.

BY J. G. JACK, JAMAICA PLAIN, MASS.

The following notes of observations of some stages of these two little saw-flies are fragmentary and incomplete, but they are now given as they may be of some assistance to others working upon this group of insects.

Taxonus nigrisoma, Nort., Larva.—The fully grown larva is cylindrical, and 10 to 12 millimeters long. It is of a pale green colour above, very slightly darker towards the sides above the spiracles, the spiracle line being marked by very minute dark dots one to each segment; and the under side (including the abdominal or prop legs) is of a dull whitish colour.

The upper part of the head is dark brown, shading from pale brown to whitish on the face and whitish beneath.

The eyes are black and prominent; antennæ small, six-jointed and light brownish coloured; and the mouth parts dark.

The thoracic legs are of a dull white colour, generally bearing more or less easily distinguishable narrow smoky brown or dark markings on the outer side of the apical segments, the strong, simple, terminal claws usually having a dark brown or black tip.

When they ceased feeding at full growth the larvæ abandoned the leaves of their food plant, which was *Polygonum Muhlenbergii*, Watson, and prepared for pupating by boring into the green stems of the food plant or sometimes into some such substance as partially decayed wood if it happened to be in the vicinity. In these burrows pupation takes place without the formation of any cocoon. The pupa is uniformly yellowish-white in colour, the dark eyes showing prominently.

Within a week or two after entering their burrows the insects emerge as saw-flies. Both larvæ and pupæ were very much parasitized by

Digitized by Google

Pimpla pterelas, Say, of which species I have bred both the males and females, the latter being by far the most abundant.

Apparently, the male imago of *Taxonus nigrisoma* has not been described, but it does not differ from the female in general appearance, except by its much smaller size.

Collected and observed in the Arnold Arboretum, at Jamaica Plain, Mass., in June, 1890: the saw-flies noted as emerging from the stems of the Polygonum about June 30 and some days later. For the determination of the food plant I am indebted to Prof. William Trelease.

Taxonus dubitatus, Nort. The larvæ of this species are of a light grass-green colour, so that it is not an easy matter to detect them when resting on the fronds of the Sensitive Fern (*Onoclea sensibilis*) upon which they feed. I have bred the saw-flies from the larvæ, but made no critical notes as to peculiar markings, if any exist. There are certainly no spots or markings large enough to be noticeable by a casual look, the whole effect being green.

The saw-flies of this species appear as early as the latter part of May and the beginning of June, and are also very abundant about the fern early in July, so that there must be at least two, and possibly more, broods. The males were seen in greatest abundance.

When at rest both males and females fold their legs and antennæ, and drop to the ground on very slight alarm.

Collected and observed at Jamaica Plain, Mass., in 1890.

NOTE ON COPIMAMESTRA AND EULEPIDOTIS.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In discovering a North American representative of the European *Brassicæ*, I proposed for this latter and our *Occidentis* the generic title *Copimamestra*, based on the tibial claw. In the Philadelphia List the term *Barathra* is resuscitated out of Hübner's Verzeichniss, p. 218, for the genus, but incorrectly. Hübner refers two species, *Brassicæ* and *Albicolor*, to his genus, and I was free to use for one of them the new term. I need not state that Hübner took no note of the structure of *Brassicæ*, and that *Albicolor* differs structurally. I must therefore insist that *Copimamestra* be used for the two species *Brassicæ* and *Occidentis* under the laws of scientific nomenclature.

In the CANADIAN ENTOMOLOGIST, when discussing Hübner's figures of North American Noctuidæ in the Zutraege, I drew attention to his

Digitized by Google

illustration of *Eulepidotis alabastraria*, figs. 311, 312, which he states to be from Savannah, Georgia, l. c. 22. It is probable that the locality is incorrect, and that this species is not found in North America. I have identified it in the Bremen Museum from South America. The insect is not a Geometrid, but belongs to Guenée's genus *Palindia*, and is described in the Spec. Gen., VI., 275, from Brazil. It seems, therefore, likely that Hübner's locality is incorrect, while Guenée makes no note upon the subject.

DESCRIPTIONS OF CERTAIN LEPIDOPTEROUS LARVÆ.

BY HARRISON G. DYAR.

(Continued from page 160.)

Ichthyura vau Fitch.

Egg.—The colour of the unhatched eggs is deep purplish-pink, pale around the bottom; slightly shining.

First stage.—Head bilobed, bearing a few hairs; shining black; width .45 mm. Dorsum broadly bluish-white, except the black cervical shield and anal plate and joints 5 and 12, which latter are hardly enlarged, coloured vinous-brown. Whole lateral area also brown but paler, and broken into patches. Feet black outwardly. Hair fine, very long laterally, pale, darker dorsally, arising singly from black conical tubercles with the normal arrangement. The body is minutely dotted with brown (under a half-inch objective) and there are no hairs present except those from the tubercles. The hairs are simple, not glandular nor branched. The cervical shield is elongated transversely, with a central constriction.

Second stage.—Head bilobed, median suture deep at vertex but shallow in front; head flattened before, slightly wider than high. Colour, shining black, with some hairs; width 7 mm. Body flattened, wider than high, the dorsal region pale yellow, with the tubercles of rows 1 and 2 darker yellow and three narrow brown lines. The enlarged dorsal portion of joints 5 and 12 and the whole lateral area is deep vinous-brown. Cervical shield and anal plate blackish, but not so distinct and corneous as before. From the tubercles arise singly long hairs, and many others arise from little elevations on the body; but these are much shorter.

[We regret that the above note, completing the description, did not reach us in time for insertion in its proper place in the June number.—Ed. C. E.]

Digitized by Google

CORRESPONDENCE.

HEPIALUS 4-GUTTATUS.

Sir: The statement on page 125 of CAN. ENT. for May, that *4-guttatus* is a synonym of the typical *argenteomaculatus*, is incorrect. The type form of the latter is the smaller not pinkish form, and is the *argenteomaculata* of the Reports on Ins. Inj. to Vegetation. The form *4-guttatus* is apparently that figured in "Lake Superior" by Agassiz. So far as I am able to judge from the short description, in which the colour seems to coincide with *4-guttatus*, the writers have apparently redescribed my *4-guttatus*.

A. R. GROTE.

ARGYNNIS ASTARTE.

Sir: It may interest your readers to know that *Argynnis astarte* (= *Victoria*, W. H. Edw., CAN. ENT., XXIII., 198, *fide* Strecker, Ent. News, Nov., 1892, p. 218) Double-Hew., which was rediscovered last year by Mr. Bean in the Rocky Mountains near Laggan, is, as far as I can judge from the single specimen he has been good enough to send me, a very near ally, and perhaps not separable from *A. amphilochus* of Menetries, a species which appears to be either very rare or very local near the head waters of the Amur river in Siberia. My specimen is smaller and paler than *Amphilochus*, but every marking seems to be identical in position. It is quite probable that when the northern extension of the Rocky Mountains has been explored, this species will be found at lower elevations, as I learn from Mr. Bean that he took it at 8,500 feet.

W. J. ELWES, Colesborne, Andoversford, Gloucestershire, England.

P. S.—I may add that I have still spare copies of my revisions of the genera *Argynnis* and *Erebia*, which I shall be glad to send to anyone who wants them in Canada or the States.

LITHOPHANE ORIUNDA.

Sir,—On the 24th of Sept., 1892, I found, in the vicinity of London, a moth new to me. It was resting in an upright position, on the stalk of a weed, quite fresh, as if it had but recently emerged. Its thoracic crest and tufts stood out conspicuously, which, with its gracefully curved and pointed wings, at once suggested a *Lithophane;* but its colour and markings were so different from what I had been accustomed to in that genus, that I hesitated to decide upon it as such.

In November I sent it with other material to Prof. J. B. Smith for

Digitized by Google

identification. He pronounced it to be a *Xylina* without doubt, but retained it for further investigation. On the 6th of March, 1893, I received a letter from him conveying what was to me the gratifying information that it had proved to be *X. oriunda*, on comparison with a typical specimen in the U. S. National Museum. I had long desired to obtain a specimen of *Oriunda*, and made inquiries for it of those with whom I exchanged, but none of my correspondents had ever met with it. *Lithophanes* have been one of my favourites, and my interest in this one was specially awakened by reading in the CANADIAN ENTOMOLOGIST, Vol. 7, p. 188, a quotation made by Mr. Grote from a letter received by him from Mr. Norman, where, after giving the names of the Lithophanes he had taken at Orillia, he adds, "and that lovely *Oriunda* a single specimen," that quotation constituting the whole of my knowledge of the insect until recently.

The original description by Mr. Grote is to be found in the Bulletin of the Buffalo Society of Natural Sciences, Vol. 2, p. 160, which I copy in full for the benefit of those of your readers who may not have the volume to refer to :—

"LITHOPHANE ORIUNDA, Grote. Allied to *L. Bethunei*, and belonging to the typical group of the genus. Distinct, intense, even, somewhat purply-brown. Forewings concolorous, with the costal edge shaded with whitish to the t. p. line, and interrupted by oblique brown streaks indicating the transverse lines. Reniform and orbicular spots more or less shaded with whitish, shaped as in *L. Bethunei*. Claviform distinctly outlined in black, large. Subterminal line alone distinctly indicated by pale points. The median dentate lines more or less lost in the ground colour. Veins terminally indistinctly black marked opposite pale dots on the brown dentate fringes. Secondaries dark fuscous, with a warmer shade on the fringes. Beneath paler, shaded with reddish, with a distinct discal spot on the paler hind-wings and a common line. On the primaries the pale costal dots are evident on both surfaces. Expanse, 34 m.m. Canada, Mr. Wm. Saunders, No. 960.

"Colour like *L. ferrealis*, but darker, with the subterminal line more even, the orbicular smaller, and the costal discoloration paler and more distinctly contrasted and limited."

This description is dated Sept., 1874.

No mention is made of the number of specimens the description is taken from, and Prof. Saunders does not now recollect the number of specimens captured by him, but knows that they were but few; perhaps not more than three. It would be very interesting if the number of speci-

Digitized by Google

mens to be found in collections could be known. So far as my information goes, it still remains an exclusively Canadian species.

J. ALSTON MOFFAT.

UNIDENTIFIED BOMBYCIDS.

Sir: Concerning Prof. Smith's note on page 164 of June CAN. ENT., it is, perhaps, unprofitable to enter into a discussion as to whether the generic names from Hübner's Tentamen should be adopted or not; but, as far as our Bombyces are concerned, there are only four of these names with which we have to do. They are: (1) *Nycteola*, Hubn., for *Sarrothripus*, Curt.; (2) *Hypercompa*, Hubn., for *Zoote*, Hubn. (Verz.), for *Euprepia caja*, Linn.; (3) *Dasychira*, Hubn., for *Dasychira*, Steph.; (4) *Melalopha*, Hubn., for *Ichthyura*, Hubn., (Verz.). The third of these introduces only a change in the name of the author; *Euprepia* cannot stand for *caja* anyway, since it must be used for the species of "Arctia" according to Mr. Kirby's method of fixing types, which seems eminently proper. The name *Arctia*, Schrank, has for its type *A. villica*, Linn., replacing *Epicallia*, Hubn. Our species, *E. virginalis*, by the way, is not congeneric with *A. villica*, nor with *C. dominula*, as Kirby puts it; but it seems hazardous to change it till the European genera have been revised. If we discard *Hypercompa* (Hubn., Tent), for *caja*, the name *Zoote* (Hubn., Verz.), comes next in order. Thus there are only two of the Tentamen names which supplant names now in use, and only one which supplants a name by a different author. It seems to us more satisfactory to adopt these names and end controversy about them, especially as they have been adopted by Kirby in his work where the Bombyces of the world are brought together in a uniform system. We dislike to depart from this standard without conclusive reason.

HARRISON G. DYAR.

AGASSIZ ASSOCIATION.

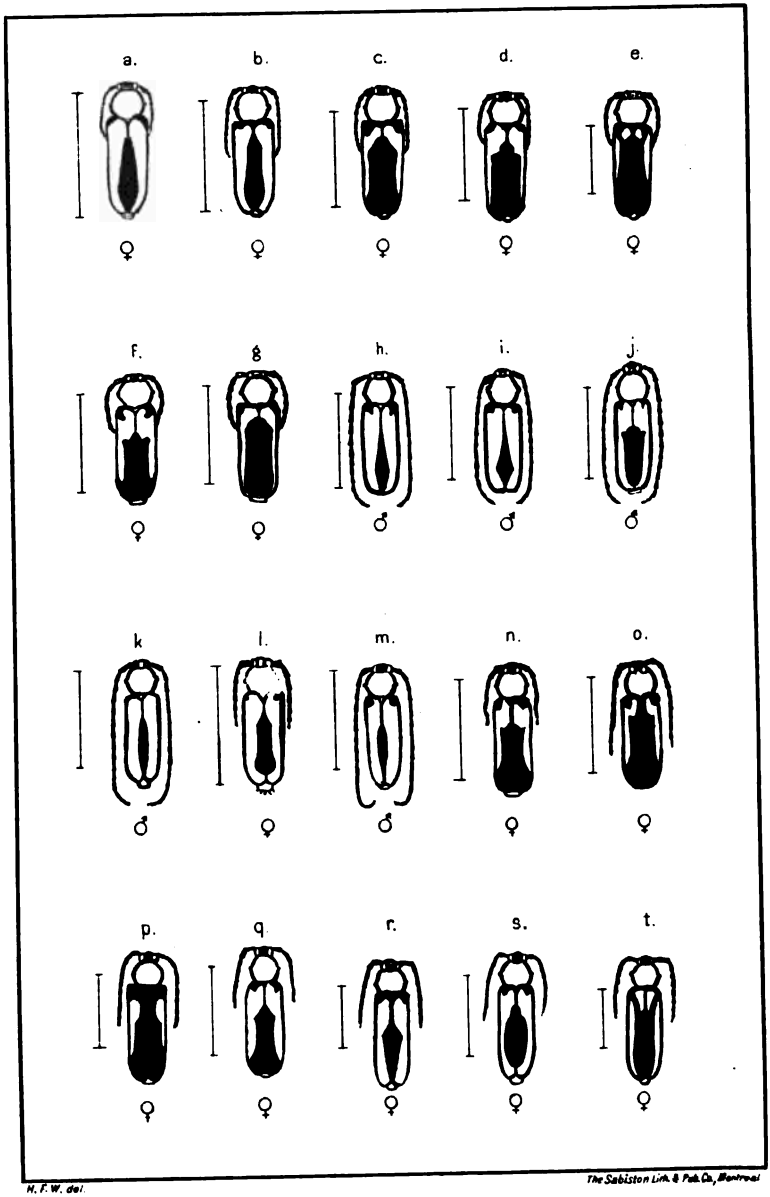
Sir,—The Henry Edwards Entomological Corresponding Chapter of the Agassiz Association invites entomological students who read this notice to join its ranks. Members are expected to keep each other informed of the progress of their work in special lines of study, and to contribute to the published reports. During the winter one or more courses in Elementary Entomology will be conducted. The initiation fee is 50 cents. For further particulars, address the Secretary,

WILLIAM L. W. FIELD, Guilford, Conn.,
(After Oct. 1, Milton, Mass.)

Mailed July 7th.

Digitized by Google

Digitized by Google



H. F. W. del.

The Sabiston Lith. & Pub. Co., Montreal

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, AUGUST, 1893. No. 8.

SOME INTERESTING COLOUR-VARIETIES IN THE GENUS CROSSIDIUS.

BY H. F. WICKHAM, IOWA CITY, IOWA.

While engaged in the re-arrangement of some boxes of Cerambycidæ recently, the peculiar modifications of the ordinarily very simple pattern of coloration in the genus *Crossidius* brought about the desire to see to what extent and under what circumstances certain of these modifications were carried on or existent. The results of the studies ensuing thereupon are presented in the present paper.

The pattern which may be regarded as the typical one, and upon which all the others are built, either by simple addition or subtraction, is as follows:—Head black, thorax black with yellow side margins, elytra yellow with the humeri and a large elongate common sutural spot black. I do not wish it understood, however, that this is to be regarded as the original pattern from which the others have been evolved through the processes of natural or sexual selection—only as a common plan of coloration, and one which forms a convenient standard of comparison.

In habit the beetles are diurnal, frequenting flowers of golden-rod and other yellow-flowered Compositæ, more especially in the arid regions of the United States and southward. In our faunal limits the genus is found from Montana and Oregon to Texas and Southern California, spreading over a vast extent of territory, and one of great differences in climatic and atmospheric, as well as of geologic characters. Under these circumstances we might well expect to find the genus composed of either many more or less closely allied species, or one or few very variable ones. My own experience goes to show that, in this group, those species of wide distribution offer many interesting variations, and to bring some of these before the reader I have prepared the accompanying plate, wherein the body and antennæ of the insects are represented in a conventional manner, and all accuracy of delineation confined to the points under discussion—the elytral pattern.

Digitized by Google

That the yellow ground colour of most of the species is of protective value, and that the black markings aid in this object by breaking the continuity of outline, I think no one will contradict who has seen these insects in their natural homes, whether he be a believer in any of the theories advanced to account for this phenomenon or not. That the variation within specific limits is also very great will not be denied by one who has seen cabinet series from various parts of the country; but the meaning of this variation and its co-relations, if such there be, with the multitudinous incidents of food, size, habitat, altitude, temperature and moisture, are not to be made out at a sitting, but will take years of thought and labour to demonstrate. The few facts, for the bringing forward of which the present paper was written, may none the less serve a useful purpose in aiding those whose investigations are of a parallel nature to keep a sort of check on their own investigations, or to find that the work of others may help to bear out the conclusions arrived at in their own.

The figures *a* to *j* of the accompanying plate represent some of the forms shown by *Crossidius pulchellus* from southern localities. It will be noticed that the lightest forms, *h* and *i*, are both males, while the darkest, *c*, *d* and *e*, are females; the male shown at *j* is, however, darker than the females shown at *a* and *b*, the pattern resembling more closely that of *g*, though the males with fusiform sutural blotch, *h* and *i*, are lighter than the correspondingly marked females *a* and *b*; this is true also of the male with shield-shaped spot *(j)*, and its corresponding females, *c*, *d*, *e*, *f* and *g*. The females, among themselves, show an increase in comparative size of the dark spot with decrease in actual size of the insect, as will be seen by comparisons of the hair-lines indicating the length of each specimen figured. The inference to be drawn here is that the female tends to the possession of increase of black markings over those of the male, and that the smaller specimens are likely to be darker than the larger.

Figures *q*, *r*, *s* and *t* are of specimens which have been referred to *C. hirtipes*, but which I am inclined to consider simply a small form of *C. pulchellus*, since they do not agree with the description of the former species. These are all females, and do not bear out well the conclusion which would seemingly be justified by the preceding series that the small specimens are darkest, since *r* is a lighter form than the larger *s*. At *t* is shown a curiously marked specimen in which the humeral spot is prolonged backward, connecting with the sutural mark at what is, in most specimens, its antero-lateral angle. This may be compared with fig. *e*

Digitized by Google

where a somewhat similar conjunction is brought about, not so much by the prolongation of the humeral spot as by the extension forward of the sutural patch.

Figure *k* represents a form of coloration sometimes seen in the male of *C. longipennis*, Casey, of which species a series of fifty specimens, all from Albuquerque, New Mexico, lies before me. Of these only two of the males are so heavily marked with black as the figure, while all but two of the females are darker, the majority tending towards *a* (but lacking the humeral spot), while one is almost as dark as *q*. In this species, as in *pulchellus*, the females are the more heavily marked with black, but the size of my specimens is so constant that no correlation can be traced between size and colour. It may be worthy of remark, however, that the specific pattern of coloration involves much less black than that of *C. pulchellus*, while the actual size of the insect averages much greater—an indication of a tendency in large species in this genus to become light-coloured as well as large individuals of some of the species.

At *l* is shown a specimen of *C. intermedius*, which will illustrate the pattern of coloration of the only specimen I possess. It differs from most of its congeners in having pale legs and antennæ, and inhabits the drier portions of the southern plains in the same localities, and with the same habits, as *C. pulchellus*, though the range is probably much less extended.

C. nitidicollis, Casey, is represented by figures *m* and *n*, and is found in the neighborhood of Tucson, Arizona, and on the foothills of the mountains near by. It will be noticed that the male shows very little black, while the female is quite dark, almost exactly resembling fig. *f* of *C. pulchellus*. Here we find the female, as usual, darker than the male.

In the figures *o* and *p*, which show the markings of *C. discoideus*, a red and black species, is noticed an extension anteriorly of the sutural mark, which here reaches the base of the wing covers, with, in one case, a corresponding increase of the humeral spots which have been spread over the whole base of the elytra, and become confluent with the sutural blotch. Both specimens are females, so no sexual comparisons can be made, though the small specimen is the darker. My specimens are from the high mountains of Colorado (Cockerell) and from Williams, Arizona, the latter place at an altitude of between 6,000 and 7,000 feet.

The results of some researches regarding melanism in insects have lately been published by Mr. J. W. Tutt, of London, England. He believes that moisture is the chief excitant cause of melanism, and has

Digitized by Google

offered proof to show that among the British lepidoptera the darkest forms are commonest in the more humid parts of England. Given an excitant cause, he shows that as moisture in the atmosphere tends to darken the soil, trees and other natural objects, natural selection would, if not interfered with by opposing forces, tend to perpetuate the melanic forms. This line of thought has suggested to me the desirability of making some inquiries regarding the climatic conditions of the different regions from which my own specimens come. A request for figures stating average annual precipitation has at once been acceded to by Prof. Mark. W. Harrington, Chief of the U. S. Weather Bureau, who has kindly sent me the appended statistics:—

Annual precipitation at	Albuquerque, New Mex.,	7.19 in.	May to Oct ,	5.42 in.
" "	Helena, Montana,	13 22 in.	" "	7.90 in.
" "	Flagstaff, Arizona,	25.95 in.	" "	9.12 in.
" "	Prescott, Arizona,	17.06 in.	" "	8.50 in.

In most of these cases the observations have extended over a number of years, but the record for Flagstaff, Ariz, has been kept for only seventeen months, and Prof. Harrington writes me that it may be too high an average. My object in getting the figures for the months of May to October (inclusive) is this: If the action of moisture on the colours of insects be purely physiological, it would act chiefly, no doubt, while the insect was growing,—that is, through the active part of the larval stage, extending through the warmer months of the year; if, on the other hand, it acts indirectly by bringing the tints of the insect, through the work of natural selection, more closely in harmony with the darker colours with which this wet weather would surround it, it must nevertheless act during these same months.

While my paper does not deal exclusively with any one species, those treated of are closely allied, and on this ground it may prove profitable to make a few comparisons.

Fifty specimens of *C. longipennis* from the driest of these points—Albuquerque, New Mexico—show thirty-two males, none of which have more than a very slender line of black along the suture, and eighteen females, most of them coloured like *h*, several as light as *k*, and only one as dark as *b*. *C. testaceus*, from the dry regions of Southern California, is also notable from its lack of black markings. I found *C. longipennis* abundant upon golden-rods *(Solidago)*, which had a very solid head of

Digitized by Google

bloom, without the reliefs of light and shade thrown by the more open inflorescense of the yellow-flowered plants on which my other species were chiefly taken. Dr. Leconte records *C. testaceus* from *Baccharis* without specifying more definitely.

Six specimens of *C. pulchellus* from Williams, Ariz., are of a rather dark form, such as shown by *g* and *d*, with the exception of two males which are somewhat lighter, as *h*, and one darker female, like *e* Four males from Peach Springs and Seligman are a very little lighter than *h*, while two females from the same localities are darker than the males, but not quite as dark as the Williams female. Three examples from Albuquerque are about the same as the Peach Springs specimens. A series of nineteen specimens from Helena Mon., averaging much smaller than those of other localities, are of a type very nearly the same as the Williams specimens, so far as regards the extent of black markings.

Summing up the evidence, then, we find:

1. Light specimens *(C. longipennis)* at Albuquerque, where the precipitation is 7.19 inches.

2. Darker ones *(C. pulchellus)* at Peach Springs and Seligman, where it is about 17. inches.

3. Still darker ones at Williams, where it is about 25.95 inches.

4. Specimens about the same as these last from Helena, Montana, where it is about 13.22 inches.

Now we have to reconcile with it, if we are to accept Mr. Tutt's theory at all, the phenomenon of specimens from Helena, with a precipitation of 13.22, presenting a phase of coloration as dark as those from Williams, with an annual precipitation of 25 95 inches. This, however, is not a great difficulty, since I have before mentioned the fact that the Helena beetles average much less in size than the more southern ones, and here I think it quite possible that we have the keynote to the whole thing. Mr. Tutt has already* adduced proof that some forms of disease produce melanism, and it has occurred to me that this species *(C. pulchellus)* having its metropolis in the south, where comparatively mild winters prevail, may find it a hard struggle to exist on the plains of Montana, where

* Melanism and Melanochroism, p 44 *et seq.*

Digitized by Google

the winters are of exceptional severity. The consequent weakening of the individuals by this undue exposure may produce a stunted and debilitated race, and the effects of this debility be shown in the lack of the bright yellow pigmentation so characteristic of the forms from the dry, warm regions of the South.

I am far from thinking that all has been written upon the subject of the variation in *Crossidius* that the occasion offers, but space has its limits and the material is too scanty to more than indicate in what direction we may look for the explanation of some of the phenomena presented. The data regarding precipitation in the different localities even cannot entirely be relied upon, as I have had to apply the average taken at Flagstaff to Williams, which is but few miles distant, and at very nearly the same elevation. In the same way it has been necessary to take that given at Prescott as approximately correct for Peach Springs and Seligman. However, I hope the article may attract the attention of more of our American students of entomology to a fascinating branch of the science, and that we may soon see in this country a number of workers who will follow out the lines of investigation suggested by our English brothers, and for the furtherance of which they have established a new magazine† especially devoted to the discussion of variation and its manifold causes. Most of my own work in this article has been suggested by the writings of Mr. Tutt, and to his works I would refer those who care to follow up the subject and learn, in a reasonable compass and without the mass of irrelevant matter which encumbers some other recent works dealing with the speculative side of entomology, what new fields of investigation may be opened up to those who like to know the histories of their insects as well as their names.

EXPLANATION OF PLATE.

Figs. *a* to *j*, *Crossidius pulchellus*, southern forms.
Fig. *k*, " *longipennis*, Casey.
Fig. *l*, " *intermedius*, Ulke.
Figs. *m* and *n*, " *nitidicollis*, Casey.
Figs. *o* and *p*, " *discoideus*, Say.
Figs. *q* to *t*, " *pulchellus*, Lec., northern forms.

†The Entomologist's Record and Journal of Variation.

Digitized by Google

NOTES ON TWO SPECIES OF TENTHREDINIDÆ, FROM YOSEMITE, CAL.

BY HARRISON G. DYAR, ROXBURY, MASS.

Schizocerus tristis, Cress.

var. FUMIPENNIS, *n. var.*

Eight examples bred from larvæ in the Yosemite Valley differ from Mr. Cresson's description in having both wings uniform smoky blackish, about as dark as the hind wings of *Hylotoma scapularis*, Klug. In the ♀, the pale parts of the legs are not white, but of an obscure sordid whitish, tinged with brown, and not contrasting with the black body parts; the abdomen is obscurely banded with brown between the segments.

Length of ♀, 6 mm.; ♂, 5 mm.; expanse of wings, ♀, 13.5 mm.; ♂, 11 mm.

Larva.—Head rounded, wider than high, the mouth parts pointed; clear green, shaded with black across the middle; ocelli black, mouth brownish; width, 1 mm. Thoracic feet large, the abdominal ones small, present on joints 5-10 and 13 (10 pairs in all). A slight subventral ridge; body transversely creased and covered with round, smooth, concolorous, wart-like elevations, uniform green, the dorsal vessel showing darker by transparency; a stigmatal row of black dots. The anal plate terminates in four short pointed projections tipped with black, and there are two others below the anus. Thoracic feet dusky. Length of larva, about 10 mm.

Cocoon.—Formed on the back of a leaf: oblong, rounded, symmetrical, composed of coarse yellowish silk of loose and irregular texture, not compact enough to be opaque.

Pupa.—Eyes prominent, cases free, the wing cases small; abdomen cylindrical, slightly tapering; colour clear green, the legs colourless, eyes black and two blackish shades on the thorax, as well as at bases of wing cases.

Food plant—*Hosackia grandiflora*, Benth.

LABIDA OPIMUS, Cress.

A ♀ example differs considerably from Mr. Cresson's description :—

var. BIGEMINA, *n. var.*

Head black; clypeus, labrum, mandibles (except at tip), palpi, lower half of cheeks, and elongate oval spot resting on the insertion of

Digitized by Google

each antenna and tip of basal joint of antenna outwardly, greenish yellow. Thorax black, the prothorax, tegulæ, two wedge-shaped bands along the parapsidal grooves, scutellum, centre of metathorax above, and a large angular spot on pleura, also yellow. Legs yellow, except the bases of coxæ, the tips of hind femora, tips of all the tibiæ outwardly and the tarsal joints, especially toward their tips, which are black. Wings smoky brownish-hyaline, irridescent, nervures black, the basal part of stigma and costa adjoining stigma yellowish. Abdomen greenish-yellow above and below, except the basal half of basal plates, a triangular spot on basal part of each dorsal abdominal segment, except the last, and ovipositor sheaths, which are black. Length, ♀, 11 mm.; expanse, 22 mm. The pair of spots between the eyes and second pair on the front part of mesothorax are conspicuous.

FITCH'S TYPES OF N. A. MEMBRACIDÆ.

BY F. W. GODING, M. D., PH. D., RUTLAND, ILLINOIS.

(Continued from page 172.)

No 3123 is *Ophiderma flava*, Godg.

No. 4416 is the type of *Thelia cratægi*, Fh.

No. 1875 is the type of *Ceresa brevicornis*, Fh. The brief description given by Fitch is correct, but not sufficiently complete. Good characters are present for separating it from its congeners.

The species labelled *Thelia Robinæ* is *T. turriculata*, Fh., and that labeled *Smilia betulæ* is *S. camelus*, Fabr. Fitch's manuscript name *Zuela* is what is now known as *Stictocephala*, Stal. The descriptions of the species of this family, published in Emmons's N. Y. Report, were written by Dr. Fitch, as is stated by Emmons in a foot note, and there is no valid reason for crediting such species to Emmons. Fitch described the species and preserved the types which are now in the collection of the National Museum; consequently, his name should be attached to all such species whenever reference is made to them. While Fitch depended largely on the distribution of colours and shape of the crest of the prothorax, yet he gave some reliable characters which are of use in identifying his species. The crest immediately after the last moult is very soft and easily mutilated, and many species might be made from the eggs of a single female were this character depended upon. It should be used only with other and less variable characters.

Digitized by Google

SYNOPSIS OF THE DIPTEROUS GENUS THEREVA.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table contains all the species of Thereva known to me as occurring in this country north of Mexico. *Thereva tergissa*, Say. (*corusca*, Weid.), and *T. crassicornis*, Will (*non Bellardi*), belong to Psilocephala. *Thereva nigra*, Say., is a true Thereva. *T. albiceps*, Loew., is evidently the same as *albifrons*, Say; and *gilvipes*, Loew., is the other sex of *flavicincta*, Loew., as that author suspected at the time of describing these two forms. Walker's and Macquart's species have not been identified, nor could this be done with any degree of certainty except by an examination of the type specimens.

The table is as follows :—

1.—Antennæ black 3
Antennæ yellow; California species 2

2.—Pile and bristles of head and thorax wholly whitish, knob of halteres yellow, front of female wholly opaque..*semitaria*, n. sp.
Pile and bristles of head and thorax largely black, knob of halteres black, front of female with a shining black spot .....*fucata*, Loew.

3.—Femora largely or wholly black 5
Femora yellow, knob of halteres black, front of female with one or two shining black spots 4

4.—Front of female with two shining black spots, front of male destitute of black pile .....*duplicis*, n. sp.
Front of female with only one shining black spot, front of male with many black pile .....*flavicincta*, Loew.

5.—Knob of halteres black 8
Knob of halteres yellow or white, front of female destitute of shining black spots 6

6.—Front of female with two large, velvet-black spots, apices of femora black 7
Front of female destitute of such spots, apices of femora broadly yellow, cross-veins of wings not bordered with brown. .....*candidata*, Loew.

7.—Stigma dark brown, cross-veins bordered with brown..*otiosa*, n. sp.
Stigma pale yellow, cross-veins not bordered..... .*vialis*, O. S.

Digitized by Google

8.—Front of female partly shining black..... 9
Front in both sexes wholly opaque and covered with pollen.....11
9.—Abdomen of female opaque on the first six segments, front with two shining black spots..... .....*Johnsonii*, n. sp.
Abdomen of female largely shining.....10
10.—Front of female with a shining black spot reaching the lower ocellus; pollen on sides of front extending less than half way from each eye to lower ocellus.....*strigipes*, Loew.
Front of female having the lower half shining, the upper half covered with pollen..... .....*hirticeps*, Loew.
Front of female wholly shining black, except each lower corner .....*nigra*, Say.
Front of female with only one shining black spot; pollen on sides of front nearly or quite reaching the lower ocellus..*frontalis*, Say.
11.—Pile of front largely black..... 13
Pile of front wholly white, front of female destitute of large, velvet-black spots.....12
12.—Bristles of occiput black, eighth abdominal segment in the female shining black, stigma dark brown.....*albifrons*, Say.
Bristles of occiput whitish, eighth segment in the female covered with pollen, stigma pale yellow.....*novella*, n. sp.
13.—Wings hyaline, the cross-veins not broadly bordered with brown..14
Wings brownish, the cross-veins broadly bordered with darker brown .....*comata*, Loew.
14.—Third joint of antennæ unusually short, inverted pyriform, the first joint very robust.....*melanophleba*, Loew.
Third joint of antennæ not unusally short.....*melanoneura*, Loew.

Thereva semitaria, n. sp. ♂ black, the antennæ, palpi, knob of the halteres, posterior margins of the second and third abdominal segments, hypopygium, femora, tibiæ, except the tips, and base of tarsi, yellow, the femora sometimes brown. Head and entire body whitish pollinose, the entire pile white, the bristles, except those of the legs, yellowish-white. Third antennal joint as long as the first and nearly twice as broad, being three-fourths as broad as long; style one-third as long as the third joint. Thorax not distinctly vittate. Wings grayish-hyaline, the costal margin usually a darker gray, veins largely yellow, very narrowly bordered with brown, stigma dark brown, fourth posterior cell closed and short petiolate.

Digitized by Google

♀ same as the ♂, except that the pollen on the upper part of the front is more yellow, and the eighth and ninth abdominal segments are shining yellow, posterior margins of the other segments also more or less yellow.

Length, 8 to 11 mm. Southern California. Eleven males and four females, in April and May.

Thereva duplicis, n. sp. ♂ black, the femora, tibiæ, tarsi, except at apex, and the hypopygium, yellow. Head gray pollinose, the pile wholly yellowish-white, that of the vertex, bristles in upper part of the occiput and on the antennæ, black; third antennal joint as long as the first and only slightly wider, style one-fourth as long as the third joint. Pile of thorax mixed black and yellowish-white, the bristles black; pile of pleura white, that on the scutellum more yellowish, the four bristles black. Pile of abdomen yellowish-white, that of the venter white, of the femora mixed black and white, of the tibiæ and tarsi black; bristles of legs also black. Wings grayish-hyaline, the veins largely brown and indistinctly bordered with brown, stigma dark brown, fourth posterior cell closed and short petiolate.

♀ same as the ♂, with these exceptions: Pile of front largely black, its pollen yellow; in middle of front are two transverse shining black spots separated from the eyes by a pollinose interval nearly equalling the length of the second antennal joint. Posterior margin of each abdominal segment, except the first, yellow, including the greater portion of the last three segments; base of the third, fourth, fifth and sixth segments, and the whole of the following ones, shining; pile of the fourth and following segments both dorsally and ventrally erect and black.

Length, 9 to 13 mm. South Dakota (Aldrich), Montana (Morrison). One male and two females.

Thereva otiosa, n. sp. ♂ black, the knob of the halteres, and posterior margins of the second and third abdominal segments, white, tibiæ, except at apex, and base of tarsi, yellow. Head white pollinose; that on upper part of front narrowly black, on the vertex grayish-black; pile of entire head, except the black pile of the vertex, white; bristles of upper part of occiput and on the antennæ black. Third joint of antennæ five-sixths as long as the first and slightly narrower, style one-fourth as long as the third joint. Thorax grayish-black pollinose and marked with two narrow whitish pollinose vittæ, the lateral margin also whitish pollinose; pile of thorax mixed black and white or yellowish, the bristles

Digitized by Google

black; pile of pleura and scutellum white, the four bristles of the latter black. Abdomen whitish pollinose, that at the base of the second, third and fourth segments blackish-gray; pile of abdomen, venter and femora white, a few on the hypopygium black; short pile of tibiæ and tarsi, like all the bristles of the legs, black. Wings, including the space between costa and auxiliary vein, grayish-hyaline, veins black, narrowly bordered with brown; stigma dark brown, fourth posterior cell narrowly open, or closed and short petiolate.

♀ same as the ♂, with these exceptions: Front dark-brown pollinose on the upper part, and near the middle marked with two large rounded velvet-black spots contiguous to the eyes; eighth and ninth abdominal segments shining, their pile largely black.

Length, 7 to 11 mm. Los Angeles County, California. Nine males and seven females, March to May.

Thereva novella, n. sp. ♂ same as *otiosa*, with these exceptions: Style of antennæ two-fifths as long as the third joint; pile and bristles of vertex and bristles of occiput yellowish-white; thorax destitute of black pile; knob of halteres brown, margined with yellow; veins of wings largely yellow, stigma also yellow and indistinct.

♀ differs from the ♀ of *otiosa*, besides in the particulars above mentioned, in that the front is destitute of the two round velvet-black spots, having instead a narrow, interrupted, dark-brown cross-band; eighth abdominal segment opaque pollinose, its pile largely yellow.

Length, 8 to 11 mm. Los Angeles County, California. Five males and one female.

Thereva Johnsoni, n. sp. ♀ black, base of third antennal joint, tibiæ, and base of tarsi, reddish. Head yellowish-gray pollinose, front with two transversely oval shining-black spots on its middle; pile of head pale yellow, that of the front mixed with black, bristles of occiput and of the antennæ black. First joint of antennæ slender, scarcely wider than the second, third joint lanceolate, one and a half times as wide as the second, three-fourths as long as the first joint; style one-fifth as long as the third joint. Thorax yellowish pollinose, marked with two light gray vittæ, the sides a purer gray; pile of thorax and scutellum pale yellow, less than half as long as the black bristles, a few black pile on the thorax; pleura gray pollinose and yellowish-white pilose. Knob of halteres brown. Abdominal segments one to six uniformly yellowish-gray pollinose and short yellow pilose, the seventh and following segments shin-

Digitized by Google

ing brown ; pile of abdomen erect and largely black. Front and middle femora destitute of bristles. Wings yellowish gray, a hyaline streak in base of marginal cell, a darker gray cloud in apex of first submarginal and along front edge of the second submarginal cell ; stigma and a small spot at base of the second submarginal and of each posterior cell, dark brown ; fourth posterior cell closed and short petiolate.

Length, 10 mm. Washington. Received from C. W. Johnson, and collected by Prof. O. B. Johnson, after whom the species is named.

SOME NOTES ON MICHIGAN INSECTS, PRINCIPALLY COLEOPTERA, AFFECTING FOREST TREES.

BY C. H. TYLER TOWNSEND.

The following notes were presented to the Entomological Society of Washington, May 1, 1890, under the title of "Some insects affecting certain forest trees." They are herewith somewhat revised and sifted for publication, since the matter which follows is of some value.

The paper furnishes a record of certain insects mostly coleopterous, which I found many years ago in Michigan affecting either the trunks or foliage of forest tress and shrubs and which I have since been able to identify in connection with my notes. All are southern Michigan records, and belong to the vicinity of Constantine. Many coleoptera found under dead bark, but which feed merely on decaying vegetable tissue, have been omitted. Such are Prionochæta, Scaphidium, Ditoma, Bactridium, Melanotus, Cis, Tenebrioides, Melandrya, Uloma, Platydema, Penthe, Cratoparis, and many others.

COLEOPTERA.

Brontes dubius, F.—Under bark of linden (fall) ; elm and butternut logs (May).

Paromalus aequalis, Say.—Under bark of decaying butternut and linden logs (May).

Hister lecontei, Mars.—In burrows under decaying bark of butternut, elm, and linden.

Adelocera aurorata, Lec.—One under bark of old oak log (Jan.)

Alaus oculatus, L.—Boring stumps and dead trunks of oak, hickory, poplar and linden.

Digitized by Google

Cardiophorus gagates, Er.—On oak leaves (May).

Elater manipularis, Cand.—Under decaying linden bark (Nov.)

Elater nigricollis, Hbst.—In hickory stump (Oct.); and poplar stump (Dec.)

Elater linteus, Say.—In decaying poplar stump (fall).

Elater apicatus, Say.—In decaying poplar stump (Dec)

Agriotes oblongicollis, Melsh.—On leaves of hazel (May); and beech (May, June).

Limonius auripilis, Say.—On beech foliage (May, June).

Limonius basillaris, Say.—On new oak and beech growth (May, June).

Acmæodera culta, Web.—On cut oak wood (July).

Agrilus ruficollis, F., *otiosus*, Say, *bilineatus*, Web.—On cut oak wood and rails (July).

Brachys ovata, Web —On foliage of beech and oak (May to July).

Brachys aerosa, Melsh.—Eating oak and hazel leaves (May); leaves of beech, elm, ironwood (*Carpinus*), (May, June).

Brachys aeruginosa, Gory.—On leaves of beech, elm, ironwood (*Carpinus*), (May, June).

Thanasimus dubius, F.—In numbers on piles of oak wood (May). In coitu (May 20).

Thaneroclerus sanguineus, Say.—Under bark oak stumps (Oct.); under bark butternut log (May).

Dichelonycha elongata, Fab.—On leaves of oak (May).

Lachnosterna prunina, Lec.—On foliage of red oak (May, June).

Lachnosterna crenulata, Fröh.—On foliage of red oak (May).

Lachnosterna tristis, F.—Swarming in red oaks (May).

Anomala undulata, Melsh.—Swarming in red oaks (May).

Strigoderma arboricola, F.—On red oaks (May). The last five species occur mostly in the evening.

Cotalpa lanigera, L.—Eating leaves of dwarf willows (*Salix cordata*), (May, June).

Parandra brunnea, F.—Under bark of linden and butternut logs.

Smodicum cucujiforme, Say.—Many specimens found on a white oak fence post, beside small holes in post from which they had emerged (June, July).

Digitized by Google

Dorcaschema nigrum, Say.—On hickory foliage (May, June).

Goes pulverulenta, Hald.—Dead beetle found in a cell in cut hickory.

Liopus alpha, Say.—On oak rails, and on fence posts under red oak tree (June).

Lepturges querci, Fitch.—On oak posts of fence under red oak tree (June).

Hyperplatys maculatus, Hald.—Same as preceding.

Saperda vestita, Say.—In sapwood, also in bark of dead linden trunk in all stages (May).

Saperda tridentata, Oliv.—Beetles and pupæ under bark of elm logs (May).

Donacia flavipes, Kby.—Twenty-seven taken on leaves of new oak growth (May 23).

Chlamys plicata, F.—On witch hazel (June).

Exema gibber, Oliv.—On witch hazel (June).

Cryptocephalus venustus, F.—On oak and hickory foliage.

Pachybrachys othonus, Say, *carbonarius*, Hald., *infaustus*, Hald.—On oak foliage.

Noda (Colaspis ?) convexa, Say.—On beech foliage.

Chrysomela scalaris, Lec.—On leaves of low sumac, hazel, linden.

Chrysomela multipunctata, Say. var. *bigsbyana*, Kby.—On leaves of low sumac *(Rhus)*.

Lina lapponica, L.—In numbers eating leaves of dwarf willow *(S. cordata)*, (May, June).

Blepharida rhois, Forst.—On low sumac.

Haltica inærata, Lec.—On foliage of ironwood *(Carpinus)*, beech and elm (May, June).

Odontota rubra, Web.—On beech, elm and oak foliage (May, June).

Diaperis hydni, F.—Twenty-five or thirty taken, Feb. 16, in groups in small passages in the inner wood of an old oak stump. Also found in same places later in the spring. When disturbed, they emit a yellowish

Digitized by Google

fluid which stains the skin, has a pungent odour, and turns alcohol to a crimson colour. The heads and legs of some worker termites dropped in the same alcohol became of a deep violet colour, but the heads of soldier termites, from their harder integument, remained unstained. These beetles exhibited considerable variation in the disposition of the black markings on their orange-red elytra. I could find no communication with their galleries from the outside. Their social hibernation is interesting.

Synchroa punctata, Newm.—Beetles and pupæ under bark of linden and elm logs (May).

Attelabus analis, Illig., *bipustulatus*, F., *rhois*, Boh.—On leaves of young hickory.

Magdalis armicollis, Say.—On elm foliage (June).

Anthonomus cratægi, Wlsh.—On beech foliage.

Mononychus vulpeculus, F.—On witch hazel (June).

Cœliodes acephalus, Say.—On witch hazel (June).

Balaninus nasicus, Say, *rectus*, Say.—Very numerous under an isolated red oak (Sept. 15 to 22 only).

Eupsalis minuta, Drury.—In dead oak and linden.

Cossonus platalea, Say.—Fifty-four taken under bark of an old butternut log (May).

Determinations of above coleoptera were made by Dr. Horn and Mr. Schwarz.

LEPIDOPTERA.—A sesiid (*Sannina*, sp.?) was bred from large knotty galls common on trunks of red oaks. These are rough excrescences of the bark and wood, frequently attaining a diameter of several feet. The moths are about the size of *S. acerni*.

DIPTERA.—The pine-cone gall of *Cecid. s.-strobiloides*, O. S., occurs commonly on *Salix cordata* (June, July). It remains conspicuous through the winter, when these shrubs are otherwise bare.

Digitized by Google

THE PHALANGINÆ OF THE UNITED STATES.

BY NATHAN BANKS, SEA CLIFF, N. Y.

The family Phalangidæ is readily separable from the other families of Phalangida by having but one simple (not compound) claw at the end of each tarsus and having a claw at the end of palpus. The last (fifth) joint of palpus is nearly always longer than the next to last; an exception is the male of Protolophus. Our species have been described by Say (Complete Writings), Wood (Bull. Essex Inst., 1868), Weed (Bull. Ill. State Lab. Nat. Hist., 1889, and various articles in Am. Nat., 1887–1893), and Banks (Trans. Ent. Soc., Wash., 1891). The genera known to me may be separated by the following key :—

1. Body with two rows of large tubercles, male with fifth palpal joint shorter than fourth, female with third palpal joint forked..... *Protolophus.*
   Body without large tubercles, fifth palpal joint always longer than the fourth.. 2
2. A group of spines on the front margin of the cephalothorax, eye-tubercle with two rows of prominent spines..... 7
   Not with both of above characters..... 3
3. Three large spines on the second joint of palpus, eyes exceedingly large..... *Caddo.*
   Without such spines, eyes normal 4
4. Femur I., much shorter than body, in the females not as long as width of body..... 5
   Femur I., longer, or in some females but little shorter than body..... *Liobunum.*
5. Metatarsus I., without false articulations, femora and tibiæ I. and III. much thickened..... 6
   At least one false articulation in metatarsus I., femora and tibiæ normal..... *Leptobunus.*
6. Eye tubercle spinose..... *Globipes.*
   Eye tubercle smooth..... *Eurybunus.*
7. Second joint of palpus with prominent spines..... 8
   Second joint of palpus without prominent spines..... 9
8. No false articulation in metatarsus I., eye tubercle more remote from the anterior margin. ..... *Lacinius.*
   At least one false articulation in metatarsus I., eye tubercle farther forward..... *Oligolophus.*
9. Femora as narrow as, or narrower than eye-tubercle, fifth joint of palpus longer than the third and fourth together..... 10
   Femora wider than eye-tubercle, fifth joint of palpus not longer than the third and fourth together..... *Homolophus*

Digitized by Google

10 { Femur I. longer than width of body.....*Phalangium*
{ Femur I. not longer than width of body.....*Mitopus*

Trachyrhinus, Weed [Am. Nat., 1892], is unknown to me; it appears to be near Homolophus, but with more slender legs, more spinose palpi, with a different patella, and larger eye-tubercle. Wood's description of *P. favosum*, however, reads much like *Mitopus biceps*, Thorell.

These genera I arrange in four tribes.

PROTOLOPHINI.

This embraces the single genus Protolophus, remarkable for the structure of the male palpi.

Protolophus, gen. nov.

In the male the second, third and fourth palpal joints are greatly enlarged, and the fifth joint is a little shorter than the fourth; the claw at the end of the fifth is, however, distinct. The female has the palpi more normal, the fifth joint longer than the fourth, the third joint is prolonged on the inner side, as in Prosalpia, and the fourth has a small projection at tip on the inner side. The eye-tubercle is low, with two rows of small spines. The legs are short, femur II. being shorter than the body; tibiæ without false articulations. The dorsal parts of the first five abdominal segments are more united than those beyond, each of these five segments having a median pair of large tubercles. Two species are known to me.

Abdominal tubercles unarmed..... .....*tuberculatus.*

Abdominal tubercles with a few apical spines.....*singularis.*

Protolophus tuberculatus, n. sp.

Length, 8 mm.; femur I., 2.3 mm.

Colour—Gray to brownish, the cephalothorax gray, the dorsum of abdomen darker, somewhat reddish-brown. Body with a broad, darker, median stripe, beginning at the anterior margin of the cephalothorax and extending to the sixth abdominal segment, narrower and darker on the abdomen than on the cephalothorax. Just below the front margin of the cephalothorax are two small median spines. The venter is pale grayish with a few brown spots near the sutures, the tips of the mandibles black, the coxæ brownish, the trochanters yellowish, the femora, patellæ and tibiæ reddish-brown, the metatarsi yellowish, the tarsi gradually becoming darker, the abdominal tubercles black. The legs are covered with small spines, on each side of the coxæ there are rows of small black plates.

The female is similar, but the dorsum is more reddish, the venter more

Digitized by Google

mottled than in the male, and there are some brown spots on the basal joint of the mandibles above.

Southern California. Not uncommon.

Protolophus singularis, n. sp.

Similar to *tuberculatus*, but the abdominal tubercles bear from two to four spines. The anterior margin of the cephalothorax is more spinose; and the second and fourth joints of the palpi are much more enlarged than in that species; the eye-tubercle is also more spinose. The legs are more slender, especially the second pair. The body and legs are more brownish, and the palpi are mottled, the second joint of the mandibles very dark.

Southern California. Collection of Dr. Geo. Marx. One male.

CADDINI.

This tribe embraces only *Caddo agilis*, remarkable for its large eyes. It shows its relation to certain genera of the next tribe in having spines on the second palpal joint. One young specimen has a white band above. I have it from N. Y. and D. C.

OLIGOLOPHINI.

The very spinose character of the members of this tribe distinguish them from all their allies.

Oligolophus pictus, Wood.

This occurs in the Eastern States.

Lacinius ohioensis, Weed.

Ohio, N. Y.

Lacinius texanus, Banks. Psyche, 1893.

Texas.

Mitopus biceps, Thorell.

Described by Thorell in 1876 from Colorado; I have received specimens from L. M. Cockerell.

Phalangium cinereum, Wood.

The northeastern parts of the United States and in Canada. [A. D. MacGillivray].

Phalangium longipalpis, Weed.

Arkansas. This would be called Cerastoma by some European authorities.

Digitized by Google

HOMOLOPHUS, gen. nov.

Quite prominent spines upon the cephalothorax and eye-tubercle, and with transverse rows on the abdomen. Legs thicker than usual, the anterior femora being much thicker than the eye-tubercle is wide, almost as thick as the basal joint of the mandibles; femur I., is a little longer than the width of the body, tibiæ without false articulations. The fifth joint of palpus is not quite as long as the third and fourth together. This genus is related to Phalangium, but the last joint of palpus is shorter, and the legs are shorter and stouter.

Homolophus arcticus, n. sp.

Length, 6.4 mm.; femur I., 4.2 mm.

Colour—Cephalothorax yellow-brown, black in the middle behind; dorsum of abdomen black; legs dark red-brown, yellow at extreme base of the femora and on the trochanters; venter brown. Eye-tubercle with two rows of a few spines; cephalothorax with scattered spines, arranged much as in *Phalangium cinereum;* abdomen with six transverse rows of similar spines; posterior angles of the cephalothorax projecting and rounded with a few prominent spines. Legs stout, very spiny, having a few more prominent spines at tips of femora, patellæ and tibiæ; second pair of legs lost.

Commander Island, Siberia. Collection of Dr. Geo. Marx.

LIOBUNINI.

This tribe includes the more typical and common members of the sub-family.

GLOBIPES, gen. nov.

The principal character of this genus is the enlarged femora and tibiæ of legs I. and III., the eye-tubercle is low and with a few spines, legs short, but femur II. is longer than the body and more than twice as long as femur I. Metatarsus I. without false articulations. The palpi are normal.

Globipes spinulatus, n. sp.

Length, 3.5 mm.; femur I., 1 mm.

Colour, brown or reddish-brown, tip of abdomen more gray, dorsum somewhat mottled with brown, coxæ yellowish, trochanters and base of femora yellowish, remainder of femora, patellæ and tibiæ reddish, metatarsi yellowish, tarsi a little darker, palpi pale, tips of mandibles black. The female has two median white spots near the tip of the abdomen. The

Digitized by Google

palpi are very short, the patella and tibia somewhat enlarged, the fifth joint longer than the third and fourth together. The cephalothorax and abdomen are smooth; the legs have many small spines, most prominent on the enlarged parts of legs I. and III.; tibia II. has three false articulations. The legs of the female are longer and more slender than those of the male. The abdomen of the female is larger and pointed behind, while that of the male is somewhat truncate.

Southern California.

EURYBUNUS, gen. nov.

Eye-tubercle very low and smooth, cephalothorax with an elevation on the anterior margin bearing a few small spines. The segments of the dorsal shield of the abdomen are so closely united that their sutures are hardly discernible. The femora, patellæ and tibiæ of legs I. and III. are enlarged; femur II. barely twice as long as femur I., and a little longer than the body; metatarsus I. without false articulations.

Eurybunus brunneus, n. sp.

Length, 9 mm.; femur I., 4 mm.

Colour—Dorsum uniform brown, the margins of the abdomen a little white; venter grayish-white; coxæ, trochanters and part of the femora yellowish, a band near tip of femur brown, the extreme tip whitish; base of patella brown, the tip white; middle of tibia brown, the base and tip white; same with the metatarsus, except that the brown is not as dark; tarsi brownish; palpi and mandibles yellowish. Body very smooth, femora I. and III. with a few short scattered spines, similar spines on the under side of tibiæ and metatarsi I. and III., tibia with three false articulations.

Southern California.

LEPTOBUNUS, gen. nov.

Legs short, joints but little thickened, femur I. much shorter than the body; femur II. frequently not as long as the body. Eye-tubercle narrow, usually smooth. *L. californicus* is the type. In this species the palpal claw is smooth, and metatarsus I. has but one false articulation; lateral pore is very large and looks outward. In the two other species the palpal claw is dentate, metatarsus I. has several false articulations, and the lateral pore is like that of Liobunum. For these reasons the last two species may form another genus.

Digitized by Google

1 { Metatarsus I., with one false articulation ..... *californicus*
  { Metatarsi I., with several false articulations 2

2 { Dorsum smooth. ..... *maculosum*
  { Dorsum granulate ..... *grande*

Leptobunus grande, Say.

Liobunum similis, Weed.

Va , D. C., Ohio, Ill.

Leptobunus maculosum, Wood.

Pa., W. Va., Ohio.

Leptobunus californicus, n. sp.

Length, 6.6 mm. ; femur I.. 2.7 mm.

Colour—white above, mottled with brown and black, the vase-mark indefinite; beneath whitish, with a few brown spots; legs yellowish, with an apical brown ring on each joint. Eye-tubercle low and smooth ; body smooth ; legs smooth, except the tarsi, which have spines at each articulation. Legs quite stout ; metatarsus I. with one and tibia II. with two false articulations ; palpi with the fourth joint longer than the third ; fifth joint about equal to the third and fourth together.

Southern California (Davidson).

LIOBUNUM, Koch.

Forbesium, Weed.

The genus Forbesium is based on young forms of previously described species. Liobunum is very rich in species ; many forms remain to be described. I will mention but one, readily recognized by having two large yellow spots.

Liobunum bimaculatum, n. sp.

Length, 4.2 mm. ; width of abdomen, 3.5 mm. ; femur I., 11.9 mm. ; femur II., 19.5 mm.

Colour—dark brown, with two large yellow spots over the juncture of the cephalothorax and abdomen ; the eye-tubercle black ; venter, palpi and legs yellowish ; patellæ and tibiæ at tip brownish ; metatarsi and tarsi somewhat brownish. Body short and broad ; the end of abdomen bent under ; the side-pieces of tne sternum appear to be completely separated from the sternum proper ; coxæ, venter and sternum with a few granules. Eye-tubercle moderately high ; more than its length from the anterior margin, and with two rows of spines above. Abdomen with a few transverse rows of small, stiff hairs. Legs extremely long, with some small spines

Digitized by Google

and a few larger ones at the tips of the femora and patellæ; tibia I. without false articulations, tibia II. with several. Second joint of palpus with small spines beneath, the third and fourth joints about equal.

Southern California. Kindly loaned to me for description by Dr. Geo. Marx.

The remaining species of this genus are as follows:—*L. vittatum*, Say, *L. dorsatum*, Say, *L. nigropalpi*, Wood, *L. exilipes*, Wood, *L. verrucosum*, Wood, *L. ventricosum*, Wood, *L. calcar*, Wood, *L. bicolor*, Wood, *L. politum*, Weed, *L. elegans*, Weed, *L. longipes*, Weed, *L. nigripes*, Weed. All are from the eastern United States except *L. exilipes*, from California; this also occurs near Olympia, Wash. State (Trevor Kincaid).

CORRESPONDENCE.

UNIDENTIFIED BOMBYCIDS.

Sir,—In regard to Mr. Smith's note on page 164 in CANADIAN ENTOMOLOGIST for June, I would say that I am the authority for the reference of *Saligena personata* to *Raphia frater*, and for the fact that now a series of specimens of *Sphida obliquata* are in Brit. Mus. Coll. under the label of "Edema obliqua." I have not the Brit. Mus. lists before me, but this series of apparently bred specimens of *Sphida obliquata*, which I found on my second, were not in Brit. Mus. Coll. at my first visit, when I examined the collection, with a specimen of the moth, for the express purpose of identifying the species. They could not have escaped my notice. They must have been added subsequently to my visit and description. On this first occasion I discovered, quite misplaced, the type of the much more obscure species *Arzama densa*, Walk.; without this identification the name *Arzama* would have hardly been placed in our catalogues. I recognized *Sphida obliquata* as allied to the type of *Arzama densa* at a glance. I examined the *Notodontidæ* carefully, making several identifications, and the specimens now under *Edema obliqua* were not then there. A reference to our original paper in Tr. Am. Ent. Soc. Phil., will show that I examined the Notodontians carefully. The probability is, that the species must remain as catalogued by me, viz.: *Sphida obliquata*, G. & R., when the facts are all known. In cases where specimens are simply stuck without type labels under printed labels in Brit. Mus. Coll., they are not to be taken as Walker's type, when in any way disagreeing with Walker's descriptions. A. R. GROTE, Bremen.

Digitized by Google

A BLACK MALE OF PAPILIO TURNUS.

Sir,—Having been a constant reader of the ENTOMOLOGIST for the past ten or twelve years, I have never found anything published in your valuable journal as regards the capture of a black male of *Papilio Turnus*. In the annual report of the Entomological Society of Ontario, for 1889, on page 38, Mr. Fletcher writes at some length in regard to the Tiger Swallow-Tail butterfly *(Papilio turnus)*. The statement to which I wish to call your attention is on page 39, on the eleventh line from top of page, where he says: "*No specimen of the black male has ever been taken; the only approach to this melanic form is a beautiful suffused variety.*" No doubt but the author was about right, for I had examined other journals and had failed to find any account bearing upon this subject, as I had one or two beautiful Papilios in my collection, and was uncertain as to what they were. The other day I was out collecting, and to my great surprise captured a beautiful ♂ and ♀ of *Turnus* in copulation, so you see there is no question as to their identity. This beautiful black male *Turnus* resembles *Papilio Troilus* in some respects, having its wings black; primaries with a marginal row of rich cream-coloured spots, whereas in *Troilus* they are a light or pale yellow; secondaries with bluish lunules, while in *Troilus* they are green, running along the margin. The anal spot with a bluish crescent as in *P. Palamedes* and in *P. Cresphontes*, while the anal spot in *Troilus* is entirely orange. Tails slender and black. After being a collector of insects for the past twenty years, both in the south and north, this was indeed the first golden opportunity and I had the pleasure of the capture of a black male *Turnus*. Its distribution covers a wide area, reaching from the far north to the confines of the tropics, going by the variety name *Glaucus* in the south, just in the same manner as Papilio Machaon of the old world, which is to be found in England, France, Germany, Northern India and Japan, and a huge variety *Hippocrates*, of Northeast China, while *P. Polydorus* and *P. Alexanor*, strictly of European origin, are limited to a much smaller territory than either *Turnus* or *Machaon*. Whilst *P. Rutulus* and its varieties *Arizonensis* and *Ammoni*, resembling in general appearance *Turnus*, but somewhat smaller, and being distinguished by its having the yellow band which runs along the posterior margin on underside of primaries unbroken, while in *Turnus* it is disconnected, is found throughout the Pacific states, P. Eurymedon, its var. *Albanus*, *P. Daunus* and *P. Pilumnus*, all of which belong to the yellow tribe of Papilios, range within the confines of the western states, while *P. Œbalus*, which bears a close resemblance to *Turnus* except that the yellow shows a slight tinge of orange, is found in Mexico, and thus far, has never been found elsewhere even as a winged visitor. More fully will these matters be treated of in my forthcoming work on "The Geographical Distribution of Butterflies and Moths."

A. S. VAN WINKLE, Keota, Iowa.

Mailed August 2nd.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, SEPTEMBER, 1893. No. 9.

DESCRIPTION OF A PECULIAR NEW LIPARID GENUS FROM MAINE.

BY B. NEUMOEGEN, NEW YORK.

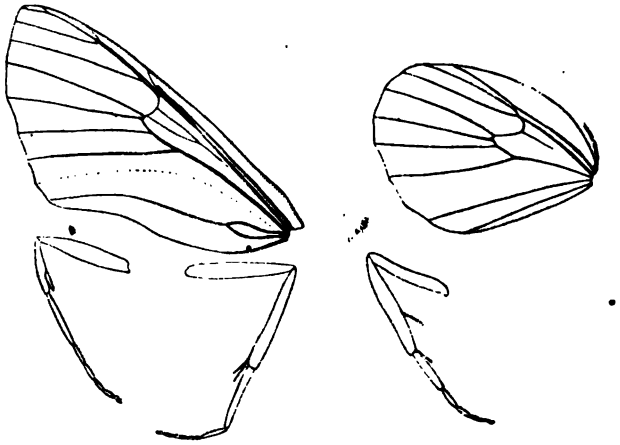
DYARIA, *nov. gen.*

Head prominent, with a high vertical tuft. Front nearly square, rather higher than broad; slightly convex. Vertex small, with a low, conical central projection. Ocelli absent. Eyes large, naked, reaching as far as the front and above the vertex. Antennæ inserted far apart, close to the margin of the eyes. In ♂ lengthily bipectinate, the pectinations diminishing gradually, the distal third being bare. To judge from the fragments of a ♀ specimen with broken off antennæ (only 6 joints left to judge from), the ♀ antennæ are apparently simple. Palpi exceeding front by two-thirds their length; second joint very large, third small. Tongue weak, but moderately long, coiled. Thorax robust, about as broad as long.

DYARIA SINGULARIS, Neum. ♂.
(Enlarged about double its size.)

Primaries well drawn out, about twice as long as broad. Costa straight, apices pointed and exterior margins well rounded. Vein 1 free and straight, furcate at base. Median four branched. Vein 2 arising very much beyond middle of cell; 4 and 5 approximate at their origin, at lower angle of cell. Cell closed, rather narrow and near to the costal edge. Cross vein bent inwardly at centre. A long, very narrow accessory cell, reaching from the apex of discal cell more than half way to apex of wing, its sides in apposition except at the two extremities, so that it is closed for the greater part of its length. Vein 6 from the under side of accessory cell, near its origin; 7 and 10 from the end of accessory cell, on each side of a stalk, which becomes furcate very close to the apex of wing, thus forming veins 8 and 9. Vein 11 from the subcostal beyond the middle of the discal cell. Vein 12 free from base.

Digitized by Google



Venation of wings and legs of DYARIA SINGULARIS, Neum, ♀.
(Greatly Enlarged.)

A furcate, false discal vein in discal cell, and a distinct submedian fold.

Secondaries about as broad as long; exterior margins well rounded, bluntly pointed at angle. Anal margins straight. Two internal veins. Median four branched, as in primaries. Vein 3 arising near lower angle of cell; 4 and 5 close together from the lower angle of cell, which is pointedly drawn out. Cell closed. Cross vein angulated, its lower, longer limb obliquely drawn out; its upper approximately at right angles to the subcostal. Veins 6 and 7 from the upper angle of the cell, 7 united to 8 at a point about one-fifth of its length from origin, then free to exterior margin. Vein 8 free from base, except at its junction with 7, nearly straight, but slightly bent at the junction, not sinuate. Traces of a discal vein.

Frenulum present; in ♀ a long double spine; in ♂ a long spine fastened into a loop on the subcostal vein of primaries.

Abdomen long and slender, exceeding secondaries by about one-fourth, thickest centrally, gently tapering; slightly tufted. Legs long and slender; the middle pair the longest, the others subequal. Anterior tibiæ unarmed, short, not longer than the first tarsal joint, with an epiphysis less than its own length, projecting with conical tip. Tarsi feebly spinulated, with terminal claws. Middle tibiæ with a pair of long, sharp apical spurs. Hind tibiæ slightly enlarged centrally, quite long and thick, with submedian and apical pair of long spurs.

Digitized by Google

Dedicated to my faithful co-labourer and friend Mr. H. G. Dyar.

This is a very queer genus; although not a typical Liparid, I do not see any other way but to place it among the Liparidæ of our fauna.

DYARIA SINGULARIS, *nov. spec.*

Eyes black. Head, as well as hairy tuft on latter, yellowish-gray. Vertex between the stems of antennæ blackish. Thorax yellowish-gray interspersed with black hair.

Wings thickly scaled, whitish-gray with the following maculations in black or light brown :—

Primaries: Three transverse lines in black. The t. a. line curving outwardly at centre. The basal space enclosed by it, densely scaled with blackish-brown hair from costa to interior margin. The t. p. line undulating, dented inwardly between median vein and interior margin. The cellular, as well as median space enclosed by the t. a. and t. p. lines, is whitish, densely dotted with black granules. A prominent black discal spot, tufted with yellowish hair. A subterminal line of black dots; space between the latter and the t. p line of light brown. Subterminal space gray, with blackish shades along veins, and a terminal line of black dots at intersection of veins. Yellowish-brown fringes.

Secondaries: An undulating mesial line, and a subterminal line of subtriangular dots, both of blackish colour. Mesian space light brown, subterminal space gray with black granules. A blackish terminal line, and a heavy tuft, along anal margin, of yellowish-gray. Fringes of the same colour. The basal space whitish with black grains. In the centre a distinct black discal spot, heavily tufted. Abdomen yellowish-gray, with black segmentary lines and white dorsal hair along latter.

Below, both wings of lustrous yellowish-gray, showing blackish tints in apical part of submedian space of primaries, as well as faint traces of the t. p. line. Very faint indications of transverse lines on secondaries. Lower part of thorax blackish. Legs yellowish-gray. Fore tibiæ and tarsi blackish, the latter dotted with yellowish at sections.

Expanse of wings, 26 mm.

Length of body, 8 mm.

Habitat: Bangor, Maine.

Type: ♂, coll: B. Neumoegen.

Caught at electric light by Prof. Carl Braun, who also sent me the fragments of a ♀ just good enough to make out the venation and to lead me to the belief that the ♀ antennæ are probably simple.

This is one of the most singular little Bombycids of our fauna, easily distinguished by its heavy scales and the hairy tufts on collar and discal dots. It resembles West Indian genera, as Prof. Smith rightly remarked to me, but Prof. Braun assured me of its Maine origin.

Digitized by Google

THE SPECIES OF EUCOPTOCNEMIS.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In 1874 I proposed the generic term *Eucoptocnemis* for the *Heliophobus fimbriaris* of Guenée, Noct. I., 172, whose statement that the species had two terminal spines on the anterior tibiæ rendered its reference to the genus *Heliophobus* of Boisduval improbable. In reality our species appears not congeneric with the European *Heliophobus hispidus*. At the time of proposing the genus I had no material. Later on I examined two or three specimens taken near the coast of Massachusetts, but they were so worn that I could not satisfactorily identify the species, while they probably belonged to Guenée's *fimbriaris*. In a considerable collection from New York, which I have identified for the Bremen Museum, I find, however, quite a number of specimens which I determine as Guenée's *fimbriaris*; the material is generally well preserved, most of the insects are quite or sufficiently perfect, and both sexes are represented. An examination gives us the following structural characters:—The abbreviated anterior tibiæ show two longer terminal spines and a row of shorter spinules on each side. Besides the pair of calcaria, the inner spur of which is shortest, the middle tibiæ are also provided with spinules; the hind tibiæ, with two pair of spurs, are also armed. The testaceous legs are sparsely clothed with pale hair (allowing the armature to be easily studied), and in this respect showing affinity to our Western *Cladocera niveivenosa*, Grt. The antennæ are long, in the male finely bipectinate, the pectinations gradually decreasing to the tips, in the female simple. The front is smooth, without tubercle. The palpi are somewhat divaricate, with short terminal article. The thorax is short and square, somewhat densely clothed with hair-like scales, pilose. The abdomen is comparatively short, not exceeding the secondaries, untufted, thinly scaled and rather weak. Wings broad, with the fringes long and even, unicolorous. Eyes naked, adorned with a variable pattern of black markings, unlashed.

EUCOPTOCNEMIS FIMBRIARIS, Guen., V., 172 *(Heliophobus)*.

Grt. Bull. B. S. N. S. I., (13), 1874.

9 ♂ s, 4 ♀ s. Forewings broad, triangulate, silky, of a more or less determinate grayish-red, in some specimens the red is quite clear, somewhat brickish in tint; this is the case in all the females examined. Maculation subobsolete. Orbicular reduced to a dark or blackish spot, which in one or two individuals shows a few central pale scales. Reni-

Digitized by Google

form upright, elongate, narrow, slightly constricted medially, yellowish, followed by a blackish arc and a more or less obvious blackish shading. Under the glass, the black scales are seen to extend along the folds and veins between the reniform and the t. p. line, while the surface of the wing, generally, is seen to be sparsely peppered with black scales. The reniform is also preceded by a curving black outline and the yellowish colour spreads a little above and below, so that Guenée's comparison of its total shape to an elongated letter x becomes intelligible, though by no means obvious. These black markings tend to be lost in the rubbed examples. The lines are seldom continuous and tend to become dotted or wholly lost, or are merely marked on costa. The t. p. line consists apparently of pale venular spots preceded by black dots. The t. a. line is in some specimens indicated, indented above and below, medially rounding outwardly. In one specimen the base of the wing shows a slight gathering or patch of black scales. Noticeably in the female specimens, which are perhaps fresher, the median lines appear as faint continuous black shades. The subterminal line is indicated by the slight difference in shade between the paler terminal and darker subterminal fields, the latter of which is marked on costa by a darker shading. A more or less obvious terminal line, sometimes well marked by interspaceal disconnected lunular marks. Hind wings variable in colour, usually quite pale with faint diffuse terminal shading, silky, in one male quite dark; terminal line variable, occasionally absent. Palpi blackish outwardly, and behind the eye usually some blackish scales. Thorax like forewings; front and collar somewhat paler. Abdomen quite pale or whitish. Beneath, the forewings are darker, the hind wings pale, the colours even, all markings lost. The male specimens vary in expanse from 28 to 36 mil.; Guenée gives 35 mil. The females average 33 mil., as near as may be.

Var. SORDIDA.

5 ♂ s, 4 ♀ s. The colour is entirely sordid grey, without trace of red. Under the glass I have, however, detected about costa a faint reddish tinge in some of the paler specimens. The yellow tinge of the reniform is less obvious. The lines are generally more distinct and continuous, and even the median shade line is often evident running near the reniform, which latter seems to indicate in this species the closure of the median cell, and is always the most prominent mark of *fimbriaris*. In one specimen of *sordida*, the basal patch is marked. There can be no doubt that this is

Digitized by Google

an extraordinary and easily recognizable colour variety of *fimbriaris*, although at first sight it might be taken for a distinct species. From the present collection it would seem to be as common as the typical reddish form. Types in Mus. Brem.

Eucoptocnemis fimbriaris would seem to be a local insect, since I have, with the one exception above noted, never before met with it in any collection submitted to me, nor have I ever collected it myself. It would seem to be not only quite variable, but its scanty markings are also easily removed by attrition, when it presents a vague and pale appearance, only the reniform being indicated. The insect is best known by its bipectinate male antennæ, its pilose thorax and weak body parts, the armature of its thinly clothed legs, the well-developed fringes, silky and comparatively wide wings. Superficially it rather resembles some of the red species of *Agrotis*. It is probable that the median lines, if fully developed, would be double, with pale included shade, judging from those specimens in which they are marked on costa. They would then correspond with the yellowish reniform, which appears as a broad abbreviated line or bar, edged with black. But, in the specimens before me, the lines are usually obliterate and, even in one fresh male, their location can be barely made out, though with the help of the microscope. I trust before long some locality will be found for this interesting noctuid, and its history be fully made out.

NORTH AMERICAN THYSANURA.—III.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Synopsis Family JAPYGIDÆ.

The family *Japygidæ* has representatives in almost all parts of the world. Nearly a dozen species have been described, the majority of which are from Europe. The species are local and rare, and not usually found north or south of about 40° of latitude. Only a single genus is known—*Japyx*.

JAPYGIDÆ.

Antennæ multiarticulate; prothorax minute; tarsi biunguiculate; claws equal; abdomen with ten segments; segments one to seven with bristle-like rudimentary abdominal appendages; caudal appendages unsegmented, horny, pincer-like.

The characters of the single genus are the same with those of the family.

Digitized by Google

The species can be easily separated by means of the following key :—

A.—Right arm of the forceps with a single large tooth.

B.—Antennæ with forty-five to forty-eight segments.....
.....*Saussurii*, Humbert.

BB.—Antennæ with about thirty segments.....*subterraneus*, Pack.

AA.—Right arm of the forceps with two large teeth; antennæ with twenty-four segments.....*americana*, MacG.

Japyx Saussurii, Humbert.

Head quadrangular, not broader than long; antennæ 45–48-jointed, segments cylindrical; prothorax very little more than half as broad as the head, truncate in front; abdomen broader behind, segments immaculate, segments one to four rounded on the sides behind, fifth and sixth with their hind angles obtuse, the seventh slightly broader than sixth, much broader and overtopping the eighth, emarginate behind, the posterior angles produced in long, slender spines, lateral margins broadly rounded, seventh and eighth subequal in length, the eighth broadly, deeply, acutely emarginate before, the posterior angles not produced, the sides straight, ninth one-third the length of the eighth, posterior angles not produced, tenth slightly shorter than the forceps, the tenth and forceps together slightly longer than the four preceding segments; right arm of the forceps slightly broader than the left, inner margin concave, a large tubercle at middle, two smaller rounded tubercles before the larger tubercle, equidistant from the larger tubercle and from each other; beyond the larger tubercle the inner margin is slightly convex, with smaller tubercles, which become smaller and smaller, from the large tubercle for two-thirds the remaining length of the arm, the remaining third smooth; the left arm is broadest at base, with a large tubercle just before the middle, a smaller tubercle midway between the base and the large tubercle, beyond the large tubercle for a short distance there are small rounded tubercles, beyond which the inner margin is crenulate, the apical half beyond the large tubercle is smooth; the antennæ, underside of the legs, body and forceps covered with stiff yellow bristles; segments 1–7 with rudimentary appendages, the apical bristle long, stout, apical half brown.

Length, 20 mm.; length of the antennæ, 8 mm.; length of the abdomen, 13 mm.; length of the last abdominal segment and forceps, 5 mm.

Habitat—Orizaba, Mexico (Lawrence Bruner).

BIBLIOGRAPHY.

Japyx, Haliday.

1864.—Haliday, Trans. Linn. Soc. Lond., XXIV., 442; pl., XLIV.

Digitized by Google

1873.—Lubbock, Monog. Collem. Thysan., 215.
1887.—Karsch, Berl. Ent. Zeit., XXXI., 154.
Saussurii, Humbert.
1868.—*Japyx*, Humbert, Rev., et Mag. Zool., 351; pl., XXII., 1–5.
1886.—*Japyx*, Packard, Amer. Nat., XX., 382.
1891.—*Japyx*, MacGillivray, CAN. ENT., XXIII., 269.
subterraneus, Pack.
1874.—*Japyx*, Amer. Nat., VIII., 501.
1891.—*Japyx*, MacGillivray, CAN. ENT., XXIII., 269.
1893.—*Japyx*, MacGillivray, CAN. ENT., XXV., 173.
americana, MacG.
1893.—*Japyx*, MacGillivray, CAN. ENT., XXV., 174.

A NEW SPECIES OF HYPOPTA.

BY HARRISON G. DYAR, NEW YORK.

An interesting species of Hypopta has been sent to me by Mr. T. D. A. Cockerell, from Las Cruces, New Mexico. It appears to be undescribed.

HYPOPTA THEODORI, *n. sp.*

White; head white, the large eyes black; pectinations of antennæ blackish; collar white; thorax clothed with light gray hairs, mixed with white; legs heavily clothed, obscurely annulate with gray near the tips. Abdomen banded with clouded pale gray above, white below. Forewings white, the basal half immaculate except for a few minute black dots along the costal edge and internal margin. These dots become more distinct toward the apex on costa. In the interspaces, and beyond the cell from vein 2 to apex of wing, is a series of diffusely clouded, strigose, pale purplish-gray patches, separated by a white space along the veins, and divided also transversely in a somewhat irregular manner. Along the discal cross-vein and near the origin of the discal and subcostal venules, the colour of these markings shades into blackish, where they abruptly terminate. Terminally, they become more obscure and strigose, leaving the fringe white. Hind wings similarly marked, but the markings are entirely pale purplish-gray, and form a series of intervenular clouded spots in three or four indistinct rows between middle of wing and margin. Beneath the markings are repeated in a somewhat leaden gray, rather more diffusely than on upper surface. Costæ of both wings with a row of gray dots and terminal dots on both. Fringe white, as above. Expanse, 29 mm. Length of body, 15 mm.

Described from a single example taken July 16, at Las Cruces, New Mexico, "a dry, flat, sandy locality, with hardly any trees but cottonwood and cultivated fruits. Its altitude above the sea is 3,800 feet." I have named the species in honour of Mr. Cockerell, whose labours in the entomological field are worthy of general recognition.

Digitized by Google

A NEW LECANIUM FROM CANADA.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

In a box of Canadian Coccidæ lately sent to me by Mr. J. Fletcher, there are several species of *Lecanium*, including one which appears to be new, and is described herewith.

Lecanium Fletcheri, n. sp.

Belongs to subg. *Eulecanium.*

♀ Scale dark reddish-brown, hemispherical, shiny, not at all elongate, more or less wrinkled or with depressions; posterior cleft short, with one or two filaments of white secretion protuding from it. Length, 2 two-thirds mm., breadth nearly the same; height, 1½ mm. (apex depressed).

Derm yellowish-brown (prepared by boiling in caustic soda); distinctly reticulate, reticulations mostly hexagonal and pentagonal. Gland pits distinct towards the margin, numerous, large, sometimes in pairs. Margin with short simple spines, not very numerous.

Legs very small, ordinary; femur longer than tibia; tibia about ¼ longer than tarsus. Tarsal knobbed hairs very long and slender, with distinct though small knobs.

Antennæ 7-jointed; 1 longer than broad, 2 shorter than 1 or 3, 3 and 4 about equal, hardly equal to 1; 5 and 6 equal, and much shortest; 7 about or nearly as long as 5 + 6, and about as long as 2, or a little shorter. Formula 1 (34) (27) (56). The seventh joint has a false joint about its middle, which in one antenna was so distinct that it was difficult not to believe it a true joint. First joint with a long hair, second with two hairs, 4 and 5 each with a hair, 6 with two, 7 with three distinct hairs.

Larva: Of the usual shape, pale-yellowish; caudal filaments nearly straight but with an outward curve, the ends usually bending inwards and crossing. Each side of the abdomen with 7 short hairs. Last joint of antennæ emitting four long hairs. Legs with clubbed digitules about twice as long as the claw, and long tarsal clubbed hairs.

Food-plant: The specimens are labelled, "on Thuja, 'cedar.'"

Hab.: No locality is given by Mr. Fletcher; very probably the specimens were on a cultivated tree at Ottawa.

L. Fletcheri differs decidedly from any species hitherto found on coniferous plants, and seems most nearly allied to *L. quercitronis*, which it much resembles. Mr. Fletcher sent me some scales on *Quercus Coccinea*, which I believe to be *L. quercitronis*, Fitch. *L. Fletcheri*, compared with these, is shorter and more globose, and the posterior cleft is decidedly shorter.

Digitized by Google

Parasite: In a scale of *L. Fletcheri* I found three specimens of a Chalcidid parasite. I have not identified the species (very likely it is undescribed), but the following descriptive notes will probably suffice for its recognition :—

Head and thorax dark metallic green; abdomen brown, shovel-shaped; ovipositor just projecting. Eyes hairy. Antennæ brown, with the two joints before the club white. Tarsi 5-jointed, first joint of middle tarsus longer than 2 + 3 + 4, last longer than 3 + 4. Middle tibia with a very stout, straight spur, but front tibiæ with a smaller curved spur. Front femora brown, with the end white; middle femora whitish tinged with brown; hind femora all brown. Front tibiæ brown, with the end white; middle tibiæ white, with a brown cloud on proximal half; hind tibiæ brown, with both ends white. Tarsi all white. Wings hyaline; stigmal club bifid. A hairless line springs from near stigmal vein and proceeds obliquely downwards and inwards. Three long hairs spring from a point on the side of the abdomen.

SYNOPSIS OF THE DIPTEROUS GENUS PSILOCEPHALA.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table contains all the species of *Psilocephala* known to me as occurring in America, north of Mexico, with the addition of one species from Jamaica, West Indies. The *Thereva crassicornis*, Williston (Trans. Am. Ent. Soc., XIII., 293, *non* Bellardi), is a true *Psilocephala;* California specimens collected by Mr. O. T. Baron were submitted to me by Mr. J. M. Aldrich, of Brookings, South Dakota, who kindly placed his Therevidæ at my disposal. The *Thereva tergissa*, Say, is also a *Psilocephala;* specimens from Florida, the habitat of Say's original specimens, were contained in a very interesting collection of Therevidæ sent me by Mr. C. W. Johnson, of Philadelphia, Pa., who had identified the specimens in question as probably belonging to Say's species. As I cannot find that Say's name had previously been used in this genus, I have adopted it in preference to the later one, *corusca*, proposed by Wiedemann. *Psilocephala erythrura*, Loew, is evidently a synonym of *pictipennis*, Wied.

The *Thereva nigra* of Say, although placed in *Psilocephala* by Osten Sacken (Catalogue of the described Diptera, page 95), is a true *Thereva;* in his original description, Say distinctly says: "Hypostoma and all beneath with gray minute hair." I have a *Thereva* from Southern California which agrees in all respects with Say's description, and as other species

Digitized by Google

of this family are known to extend across the continent (I have examined specimens of *Thereva comata* from California and New Hampshire, *Psilocephala haemorrhoidalis* from New Jersey to Arizona), there is strong reason for believing that this is the true *Thereva nigra* of Say. For the species that has hitherto borne Say's name in collections, I have adopted Macquart's name of *haemorrhoidalis* (described under *Thereva*), since it is very probable that this author had specimens of the present species before him when drawing up the description to which the above name is attached.

Psilocephala melampodia, platancala, variegata and *levigata* are unknown to me except from the descriptions; of the remaining species I have seen only males of *melanoprocta* and *notata*, and only females of *rufiventris* and *scutellaris*.

The table of species is as follows:—

1. Fourth posterior cell open; front wholly opaque and covered with pollen 2
   Fourth posterior cell closed and usually petiolate 10
2. Femora black, or blackish-brown 3
   Femora and knob of halteres yellow ..... { *Slossoni*, n. sp. / *montivaga*, n. sp.
3. Wings destitute of blackish spots, except sometimes on the cross-veins 4
   Wings marked with over a dozen blackish spots, many of which are not situated on the cross-veins; abdomen wholly opaque; antennal style nearly half as long as the third joint ..... *tergissa*, Say.
4. Knob of halteres blackish-brown 5
   Knob of halteres, and hypopygium of male, yellow; first and third antennal joints subequal in length, the style nearly half as long as the third joint ..... *morata*, n. sp.
5. Thorax marked with light and dark coloured vittæ 6
   Thorax not vittate 8
6. Tibiæ yellow 7
   Tibiæ black, abdomen of female largely shining. *melampodia*, Loew.
7. First joint of antennæ much longer than the third, and extremely robust; California species ..... *crassicornis*, Will.
   First joint of antennæ much shorter than the third and not unusually robust; Florida species ..... *festina*, n. sp.
8. Tibiæ black, cross-veins of the wings not bordered with brown;

Digitized by Google

California species..... 9
Tibiæ yellow, cross-veins of wings bordered with brown; Eastern species .....*variegata*, Loew.
9. Third joint of antennæ scarcely longer than broad, pile in front of the halteres, and on the abdomen and legs, wholly white.....*baccata*, n. sp.
Third joint of antennæ twice as long as broad, pile in front of the halteres, and on the abdomen and legs, largely black.*pavida*, n. sp.
10. Scutellum black.....11
Scutellum orange-red, wings beyond the middle marked with two dark gray cross-bands.....*scutellaris*, Loew.
11. Abdomen black.....12
Abdomen largely orange-red, wings beyond the middle marked with two dark-gray cross-bands.....*rufiventris*, Loew.
12. Wings destitute of dark-gray cross-bands.....13
Wings beyond the middle marked with two dark-gray cross-bands, much abbreviated in the male; two widely separated thoracic vittæ, and the apex of the scutellum, deep velvet black .....*pictipennis*, Wied.
13. Front wholly opaque and covered with pollen, tibiæ largely yellow 14
Front partly shining.....16
14. Knob of halteres, proboscis and palpi, yellow.....15
Knob of halteres, proboscis, palpi and hypopygium of the male, black; eastern species.....*melanoprocta*, Loew.
15. Antennæ yellow; California species.....*marcida*, n. sp.
Antennæ black; Jamaica species.....*obscura*, n. sp.
16. Tibiæ largely or wholly yellow.....17
Tibiæ and marginal cell wholly black; California species.*costalis*, Loew.
17. Knob of halteres blackish.....19
Knob of halteres and hypopygium of male yellow, front shining except on its lower corners.....18
18. First joint of antennæ three-fourths as long as the third, wings hyaline, the veins never clouded with brown.....*Aldrichii*, n. sp.
19. Femora blackish.....21
Femora yellow.....20
20. Pollinose spots on lower corners of the front contiguous; wings nearly hyaline.....*notata*, Wied.

Digitized by Google

Pollinose spots separated by a wide interval; wings smoky-brown.....*Johnsoni*, n. sp.

21. Front shining except on each lower corner.....22
Front having the lower third opaque pollinose.....*munda*, Loew.

22. Costal cell blackish-gray, veins bordered with brown.*platancala*, Loew.
Costal cell hyaline, veins not bordered.....23

23. Pollinose spots on lower corners of the front contiguous..*notata*, Wied.
Pollinose spots separated by a wide interval..*haemorrhoidalis*, Macq.

Psilocephala festina, n. sp.—♂ Black, the abdomen brownish, the tibiæ and base of tarsi yellow. Front and face silvery-white pollinose, eyes narrowly separated by a white pollinose interval; first antennal joint two-thirds as long as the third, style slender, cylindrical, nearly half as long as the third joint, the latter one and one-fourth times as wide as the second joint; bristles of antennæ and of upper part of occiput black, pile of lower part of occiput and of the mouth parts white. Thorax lightly white pollinose and with three grayish-black vittæ, pile very short, mixed white and black, bristles black, pleura and scutellum white pollinose, scutellum bearing only two bristles. Abdomen wholly silvery-white pollinose and sparse white pilose, that on the hypopygium and on the fourth and following segments of the venter largely black; wings hyaline, apex of subcostal cell yellowish, fourth posterior cell broadly open.

♀ Same as the ♂, except: Front grayish-white pollinose. Abdomen shining, except a white pollinose spot on each side of the first, fifth and sixth segments and a crossband on the posterior margin of the second and third segments. Length, 6 to 7 mm. Florida (Johnson).

Psilocephala morata, n. sp.—♂ Same as *festina*, with these exceptions: Palpi, knob of halteres and hypopygium yellow; upper third of the front brown pollinose, eyes not separated by a white interval; first antennal joint nearly as long as the third, the latter nearly twice as wide as the second. Thorax opaque, grayish-black pollinose. Scutellum bearing four bristles. Pile of entire venter white.

♀ Same as the ♂, except: Lower third of front white pollinose, the remaining portion blackish brown pollinose. Abdomen shining black, first segment and posterior margins of the second, third, fifth and sixth segments white pollinose, the narrow hind margins of the first three segments white; sparse pile of abdomen and venter largely black, except that of the first segment, which is light-coloured. Wings grayish-hyaline,

Digitized by Google

the stigma yellowish. Length, 6 to 7 mm. New Jersey, Florida (Johnson).

Psilocephala baccata, n. sp.—♂ Wholly black, including the tibiæ, halteres and hypopygium; posterior margin of the second and third abdominal segments, both dorsally and ventrally, sometimes narrowly white. Pollen of face grayish-white, that on the lower half of the front somewhat brownish, on the upper half black; pile of head white, a few on the front and vertex black, bristles of occiput and of antennæ black. First joint of antennæ nearly twice as long as broad, the third joint once and a-half as broad as, but not quite as long as, the first, being scarcely longer than broad. Thorax very lightly gray pollinose, not vittate, the pile and bristles black, the surface sparsely covered with appressed light-yellow tomentum. Pleura, abdomen and venter densely silvery-white pollinose and white pilose, pile of abdomen appressed. Pile of femora and coxæ white, the bristles, as well as those of the tibiæ and tarsi, black. Wings hyaline, stigma brown; fourth posterior cell open.

♀ Same as the ♂, with these exceptions: Pollen on upper three-fourths of front brownish-gray, that on the lower fourth white and with a round black spot next each eye at the junction of these two colours. Abdomen and venter shining black, the posterior margin of the second, third and fifth segments silvery-white pollinose, broadest on the fifth.

Length, 5 to 7 mm. Los Angeles and San Bernardino Counties, California. Twelve males and two females, in May.

Psilocephala pavida, n. sp.—♂ Differs from the above description of *baccata* only as follows: Third joint of antennæ twice as long as broad. Pile in front of halteres largely black; pollen of abdomen black, that on posterior margin of the second and third segments light-gray; pile of abdomen black, that on the first segment and apices of the remaining segments whitish. Pile of coxæ and femora largely black.

Length, 6 mm. Los Angeles County, California. A single specimen; in April.

Psilocephala montivaga, n. sp.—♀ Black, the knob of the halteres, femora, tibiæ, and base of the tarsi, yellow. Front brown pollinose, that next the antennæ yellow, a spot on each side next the eyes and a median triangle, black pollinose; face yellow pollinose; pile and bristles of antennæ, pile of front and bristles of occiput, black, pile of occiput and of mouth parts white. Antennæ of nearly an equal width, the third joint tapering slightly to the apex, first joint three-fourths as long as the third,

Digitized by Google

style one-fifth as long as the third antennal joint. Thorax yellow pollinose, that each side more gray, marked with three broad black stripes; pile of thorax short, sparse, mixed black and yellow, the bristles black; pleura gray pollinose, its pile white. Scutellum black pollinose, that on the margin grayish-yellow, its pile sparse, yellow, the four bristles black. Abdomen shining, except the first segment, base of the second and sides of the first four segments, which are gray pollinose; pile of the first four segments mixed yellow and black, that on the remaining segments wholly black. Wings grayish-hyaline, stigma yellow, fourth posterior cell broadly open.

♂ Same as the ♀, except that the abdomen is wholly silvery-white pollinose, its pile wholly yellow; hypopygium yellow, its pile yellow and black. Length, 10 to 13 mm. Los Angeles County, Cal. One male and two females, in June.

Psilocephala Slossoni, n. sp.— ♀ Black, the palpi, halteres, femora, tibiæ, and base of tarsi, yellow. Face and front grayish-brown pollinose, front with two velvet black spots at its middle adjacent to the eyes; pile of front, occiput, mouth parts and of antennæ whitish, bristles of antennæ and of upper part of occiput black; third antennal joint three-fourths as long as the first, scarcely wider than the second, first joint nearly twice as wide as the second, the style one-third as long as the third joint. Thorax brownish-gray pollinose, marked with two narrowly separated median grayish-black vittæ and with a much broader lateral one; pile of thorax light-yellow, the bristles black; pleura whitish pollinose and white pilose. Scutellum brownish-gray pollinose, white pilose, its four bristles black. Abdomen grayish-brown pollinose, that on apex of each segment broadly light-gray, the pile whitish. Wings gray, lighter in the middle of the cells, leaving a dark-gray border to the veins; stigma brown, fourth posterior cell broadly open.

Length, 10 mm. New Hampshire (Johnson). A single female specimen, collected by Mrs. A. T. Slosson, after whom the species is named.

Psilocephala Aldrichii, n. sp.— ♂ Black, the knob of the halteres, hypopygium, tibiæ and base of tarsi yellow, posterior margin of the second and third abdominal segments white. Front shining, its lower corners, not extending halfway to base of antennæ, white pollinose, like the face. Pile of mouth parts and of occiput white, that of the cheeks largely black, bristles of upper part of occiput and of the antennæ also black. First joint of antennæ three-fourths as long as the third, the

Digitized by Google

latter narrowly lanceolate, six times as long as the style. Thorax somewhat shining, marked with two white pollinose vittæ scarcely half as wide as the interval between them, and sometimes indistinct; pile of thorax and of scutellum whitish or yellow, that of the pleura white; scutellum bearing four black bristles. Abdomen lightly white pollinose, its sides, except on the first segment, shining, the pile white, that near the apex below and on the hypopygium sometimes partly black. Wings hyaline, the veins and stigma light-yellow; fourth posterior cell closed and petiolate.

♀ Same as the ♂, except that the abdomen is not wholly pollinose, and its pile is largely black. Length, 7 to 8 mm. New Jersey (Johnson), Montana, Wyoming (Aldrich), and California. Four males and one female, in July. I take pleasure in naming this species in honour of Mr. J. M. Aldrich, from whom one of the specimens was received.

Psilocephala Johnsoni, n. sp.—♀ Black, the femora, tibiæ, base of tarsi, and posterior margin of the second, third, fourth and fifth ventral segments, yellow. Front shining, each lower corner and the face white pollinose; bristles of antennæ and of upper part of occiput black, pile of lower part of occiput and of the mouth parts white; first antennal joint slightly longer than the third, the latter one-fourth wider than the second, style one-fifth as long as the third joint. Thorax grayish-brown pollinose, marked with two widely separated light-gray pollinose vittæ, the sides broadly shining; pile of thorax short, and like the bristles, black; pleura white pollinose, its pile white. Scutellum shining, except the gray pollinose margin, its bristles black. Abdomen shining, the first segment lightly white pollinose, posterior margins of the second and third segments white, a large white pollinose spot on each side of the fifth segment, the two spots almost contiguous; pile of abdomen mostly black; venter white pollinose, pile of the first three segments white, the rest black. Wings smoky-brown, the middle of some of the cells lighter, stigma darker brown, fourth posterior cell closed and petiolate.

Length, 9 mm. Florida. A single specimen received from Mr. C. W. Johnson, to whom it gives me pleasure to dedicate this interesting species.

Psilocephala marcida, n. sp.—♂ Black, the antennæ, proboscis, palpi, halteres, hypopygium, femora, tibiæ except apex of each, and base of tarsi, yellow, the femora and abdomen sometimes brown; posterior margin of the second, third, fourth and fifth abdominal segments, both dorsally

Digitized by Google

and ventrally, white. Head (usually) and entire body densely white pollinose, but that of the head sometimes yellow; the pile white. Antennæ having the first joint once and a-half as long as broad, slightly shorter than the third joint, the latter nearly as broad as long. Wings whitish hyaline, stigma yellow; faint clouds are perceptible on the cross-veins; fourth posterior cell closed and petiolate.

Length, 8 mm. Los Angeles and San Diego Counties, California. Two specimens.

Psilocephala obscura, n. sp.— ♀ Black, the palpi, proboscis, tibiæ, base of tarsi, knob of halteres, posterior margins of the second, third and fourth abdominal segments, and the greater portion of the three following segments, yellow. Front and face brownish-gray pollinose, short pile of front, bristles of antennæ and of upper part of the occiput, black, pile of lower part of occiput and of the mouth parts white; first and third antennal joints subequal in length, style one-third as long as the third joint, the latter nearly twice as wide as the second joint. Thorax grayish-brown pollinose and with two widely separated light-gray pollinose vittæ; pile of thorax mixed yellow and black, the bristles black; pile and pollen of pleura white, scutellum grayish-brown pollinose, that around the margin light-gray, the four bristles black. Abdomen shining, the first segment lightly pollinose, posterior margins of the second, third and fourth segments, and greater portion of the fifth and sixth, white pollinose; pile of first two segments yellowish, that on the remaining segments and on the venter largely black. Wings hyaline, stigma yellow, fourth posterior cell closed in the margin.

Length, 7 mm. Kingston, Jamaica (Johnson). A single specimen.

ON SOME LEPIDOPTEROUS LARVÆ ON ALFALFA.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA, W. I.

During the last two years a considerable number of rather small lepidopterous larvæ have been found on alfalfa (*Medicago sativa*) in Southern New Mexico. In the material collected there are nine distinct species represented. None of them have been bred. These larvæ are of considerable economic importance, as they occasion a certain amount of injury to the alfalfa crop, which is the surest and most paying crop of the Mesilla valley. They are of some scientific interest also, since hardly anything is recorded of alfalfa insects. It is therefore thought advisable to publish the following descriptions of these larvæ, which were made

Digitized by Google

some time ago, and which will serve to identify them on the alfalfa plant hereafter, besides giving an idea of the forms which occur on alfalfa in this locality. They were all collected in Las Cruces. The figures in parentheses refer to the alcoholic specimens of the species in the entomological collection of the New Mexico Agricultural Experiment Station.

(a).—SMALL, BROWNISH AND BRISTLY LARVA.

Stage 2.—Length, 2 to 2½ mm. Brownish or blackish. Five pairs of prolegs on segments 7 to 10 and 13. Head distinct, chitinous, shining polished black; dorsum of prothorax also chitinous, emarginate behind, blackish. Rest of larva brownish, each segment with twelve circular dot-like raised blackish papillæ in an irregular transverse row, each papilla bearing a black hair. Rows on thoracic segments straighter. Head and prothorax also hairy. It is barely to be perceived that the whole integument is covered with microscopically short, bristly pubescence. Ten specimens.

Stage 3.—Length, 3 to 4 mm. Head black, variegated with brownish, or wholly very light, even pale-yellowish. Proscutum black. Ground colour of larva about same as in preceding stage; tubercles a little more conical in form, black. The spiracles must not be mistaken for tubercles, the former being smaller and showing on most of the segments in all the stages. Microscopic bristly pubescence of integument slightly more evident. Seventeen specimens.

Stage 4.—Length, 5 to 5½ mm. Head usually very light, with four faintly mottled areas of brownish; prothorax rather light, but oftener of the brown colour of rest of body. Tubercles more strikingly conical. The integument shows very plainly the short, stubby, whitish and brownish bristles, usually in longitudinal whitish and brownish rows. Nine specimens.

Stage 5.—Length, 5½ to 7 mm. Head large, very pale-yellowish, only three of the mottled faint brownish areas, the one near oral margin being more or less obsolete. Black tubercles or papillæ very conical; hairs longer and stouter, the larva therefore appearing somewhat more bristly. The stubby, bristly growth of integument is very apparent in its narrow, longitudinal, alternating white and brown rows. Eight specimens.

Stage 6.—Length, 7½ to 9 mm. Head about same as preceding stage. Prothorax darker. The white longitudinal rows of stubby bristles showing most plainly in the median region, and on each side. Five specimens.

Digitized by Google

Stage 7.—Length, 9½ to 10 mm. Larger, brownish in general colour, broadly whitish laterally on sides, and the stubby bristles of integument showing very plainly, the white rows mostly on median region. Three specimens.

The above stages have been separated solely by examination, but are probably approximately correct. Described from alcoholic specimens, swept from alfalfa May 28, 1891. Specimens of the same larva, from 3 to 7 mm. long, had been previously swept from alfalfa, May 9 to 12. General colour noted in life. (Nos. 18, 30.)

(b).—YELLOWISH LARVA, WITH BLACK WARTS OR TUBERCLES.

Length, nearly 7 mm. Five pairs of prolegs, on usual segments. Hardly any hairs above, rather long hairs on sides and below, all these hairs directed downward. Head black, with a yellow triangular area in middle, and with yellowish oral region and antennæ. Prothorax with six black spiniferous tubercles in a transverse row, and two blackish markings on posterior border. Other thoracic segments with the same six black tubercles, and also with two similar but somewhat smaller yellowish tubercles, one on each side of the median pair of black ones. All the abdominal segments, except the anal, with the same tubercles as last two thoracic segments, but each in addition with a median anterior pair of small blackish tubercles situated between and slightly anterior to the median large pair.

One specimen, swept from alfalfa May 12, 1891. Colour noted in life. (No. 79.)

(c).—PALE GREENISH, NEARLY BARE LARVA.

Length, 8 mm. Light-greenish, inclining to brownish posteriorly, with a whitish stripe on each side of the body. Five usual pairs of prolegs. Integument bare and without hairs, except on venter. Head and feet light coloured, pale-yellowish. Methorax with a pair of black spots on dorsum, each spot just inside the lateral white stripe. Fifth (first abdominal) segment with a pair of larger black spots, one on each side just outside or below the lateral whitish stripe. Each of the lateral whitish stripes with two narrow brown lines running its whole length and more approximated to lower border. The greenish median portion has three lighter narrow longitudinal lines, one being median, and the outer ones very closely approximated to the lateral whitish stripes.

One specimen, swept May 9, 1891. Colour noted after a few days' immersion in alcohol. (No. 29.)

Digitized by Google

(d).—PALE-YELLOWISH, RATHER STOUT AND QUITE HAIRY LARVA, WITH BROWNISH STRIPES.

Length, 10 mm. Ground colour very pale-yellowish or whitish. Five usual pairs of prolegs. Head, prothorax, anal segment and whole ventral surface especially pale. A lateral rather wide stripe on each side encloses the spiracles; each section of it, corresponding to an abdominal segment (except on anal), marked by the spiracle in the centre, and extended into a sharp prolongation dorsad, ventrad and caudad (especially the first two), bearing a small dark papilla from which springs a long hair; a similar papilla below the sections bears a similar hair. Dorsum of larva with three pairs of brownish longitudinal lines, a median and two lateral ones. Between these are whitish and pale-brownish lines, the dorsal integument being covered with short, stubby bristles of these colours; and each segment with two pairs of light, smooth and naked tubercles, each bearing a rather long hair, the anterior pair of tubercles more approximated to each other than the hind pair. The head and prothorax also bear hairs.

One specimen, swept May 28th, 1891. (No. 228)

(e).—GREEN LARVA, WITH A WHITISH LINE ALONG EACH SIDE OF BODY.

Length, 14 mm. Venter light. Usual five pairs of prolegs. Whole surface of body, both above and below, evenly and quite thickly clothed with fine, short hairs. Head concolorous, similarly clothed with hairs. Hairs arising each from a small, black, dot-like tubercle, which occupies the centre of a circular naked areole, the rest of the epidermis being covered with microscopic black spines which appear only as closely approximated minute specks under a high power lens. These areoles are particularly distinct on dorsal regions, somewhat less so on sides of venter, the median ventral region and head not showing the microscopic epidermal specks. The dots from which the hairs arise are also absent on median ventral region. The principal segments show five transverse wrinkles or folds above, dividing the dorsum of the segment into six transverse sections; each section usually bears a row of areoles, though some have additional ones irregularly interspersed, which are usually smaller. These transverse wrinkles stop at the whitish lateral line on each side, which defines the lateral edge of dorsum.

One specimen, swept May 12, 1891. Colour noted in life. (No. 78.)

(f).—GREEN LARVA SIMILAR TO PRECEDING.

Length, about 23 mm. This exactly resembles the preceding *(e)*, except in one or two details, which may indicate its distinctness, or may

Digitized by Google

indicate only a greater number of moults. If it is not the same, it is a very closely allied species. Colour is green, with two lateral longitudinal narrow whitish stripes, one marking the lateral edge of dorsum on each side and enclosing the spiracles, and in addition a median dorsal pair of similar stripes. Head is lighter than dorsum, approaching more nearly the colour of the stripes; venter light. The same microscopic black epidermal specks or spines are present, and the same naked areoles with dot-like tubercles in the centre, but the portion of the integument covered by the dorsal stripes has lost both apparently. These are shown, however, to be lost only in colour, the microscopic spines being apparent in the stripes where the integument is transversely folded, but they are concolorous instead of black. Their colour is also nearly lost on anal segment. Dot-like hair tubercles of head brown.

One specimen, swept Oct. 24, 1892. General colour noted in life. (No. 365.)

(g).—VERY SLENDER AND ELONGATED BROWNISH SPAN-WORM.

Length, 9 mm. Two pairs of proportionally large prolegs, on segments 12 and 13. Colour brownish, with a somewhat lighter ventral line, and a pale lateral stripe or line on each side. Head, prothoracic segment and anal extremity light. Abdominal segments very elongated, almost bare, with some sparse minute tubercles giving rise to hairs. The main abdominal segments are more noticeable for being divided by minute transverse constrictions or wrinkles extending completely around the body into something like thirty or more transverse sections to the segment.

One specimen, swept May 28, 1891. Colour from alcoholic specimen. (No. 229.)

(h).—PALE COLOURED FALSE SPAN-WORM.

Length, 4 mm. Three pairs of prolegs, on segments 9, 10 and 13. Light or pale coloured, with small brownish warts and hairs. Somewhat elongate, and rather slender. Segments not elongate. Head nearly concolorous, slightly more yellowish and polished. About twelve small, flattened-conical tubercles to each abdominal segment, each tubercle bearing a hair, and some smaller ones on ventral surface below. Tubercles in an irregular transverse row. Except the tubercles, the integument is apparently naked under the lens.

One specimen, swept May 28, 1891. Colour noted in life. (No. 230.)

Digitized by Google

(i).—LIGHT GREEN FALSE SPAN-WORM.

Length, 7 to 8 mm. Three pairs of prolegs, on segments 9, 10 and 13. Elongate and rather slim, light green in colour. Segments not longer than wide; with but very few short hairs, each arising from a minute pale brownish dot in centre of a rather indistinct tubercle, a dozen or so to each principal segment. Head likewise with hairs, which arise from less plain dots. In addition to these, there is on each side of segments 5 to 11 a conspicuous black tubercle bearing a hair, these tubercles being of same form as the others, but appearing much more conspicuous and larger because of the black pigment they possess.

Two specimens, swept May 12, 1891. (No. 80.)

NOTE.—The measurements given above were made from the alcoholic specimens, and are somewhat (usually a millimeter or so) less than what the same specimens measured in life.

CORRESPONDENCE.

REARING SPHINX CHRYSALIDS.

Sir: On the 30th of July, 1892, I saw a Sphinx larva digging into the ground at the foot of an ash tree, evidently with the intention of burying itself preparatory to transforming. I put it into a box I had in my satchel, and forgot it until three days after. When I opened the box there was a perfectly formed chrysalid instead. I placed it on the same bed that the *Quinquemaculata* of my former record had matured upon (CAN. ENT., Vol. 24, p. 237), and paid no further attention to it. On the 20th of June, 1893, that chrysalid gave forth a *Sphinx chersis*, Hub., large in size, perfect in form and rich in colouring. This surely proves that moisture is not an absolute necessity for the maturing of Sphinx pupæ, of these kinds at least.

In my earlier efforts to obtain moths from Sphinx pupæ I had no success. Being under the impression that moist soil was necessary for their maturing, all the careful attention I could give them was unavailing; they invariably died. Observing that soil getting between the segments of the abdomen irritated them greatly, and kept them constantly wriggling, I got some growing moss, put it on a plate, placed the chrysalids on it, moistening it slightly, when all my troubles with them disappeared,—no more moulding or drying up, they matured without fail, and the moths emerged in perfect condition. This simple method was to me a most gratifying success. I could now obtain the moths with no special attention required for the chrysalids.

Digitized by Google

In nature, the larva makes a cavity in the soil to transform in, pressing the soil firm and making the inside of the cavity as smooth as that of a silken cocoon. So that the pupa lies perfectly free, which will account for the fact that when placed in soil they always work themselves to the surface. Freedom from irritating matter is then, I suspect, one of the principal factors for successful maturing of them. And to those that have passed the winter in natural conditions, moisture may be another, but those that have begun their pupal existence in unnatural conditions do not seem to feel the need of it.

We know that it is comparatively an easy thing to get the pupa from a sphinx larva, besides getting the imago from the pupa; if, then, such pupæ can be matured without the labour and care required to get up and maintain "natural conditions," with the probability of a disappointing failure at the end of it all, what an inducement it would offer to many to undertake the rearing of them who are now prevented from attempting it by the elaborate preparations that seem required to ensure success. Whilst, if safety and a soft bed is all that is required for success, many a valuable chrysalid that is now rejected or neglected, under the impression that it would be hopeless to attempt to rear it with the means they have on hand, might be reared to add rare forms to a collection, or even to aid in the identification of earlier stages of some of the species. An experiment on an extensive scale in this direction is well worth the making.

J. ALSTON MOFFAT.

BOOK NOTICE.

BRIEF GUIDE TO THE COMMONER BUTTERFLIES OF THE NORTHERN UNITED STATES AND CANADA: by S. H. Scudder. Henry Holt & Co., 12mo., pp., XI + 206., 1893.

It has been known for some time that Mr. Scudder has in preparation a Manual of the Butterflies of the Northern United States and Canada, similar to Gray's Manual of Plants, and all must agree that such a work is much needed. The present "Brief Guide" has, however, been produced in the meantime to meet a demand for something even less technical, by means of which boys and girls might be tempted to enter the ever charming fairy-land of science by having an easy way laid open before them. There are few objects in nature which so soon thrust

Digitized by Google

themselves upon the notice of young people as flowers and insects, and of these none have been so useful as a first stepping-stone or allurement to the realms of Natural History as butterflies,—" those winged creatures of beauty which add such a charm to the summer landscape."

There was not, however, until now any work which could be placed in the hands of boys or girls who had caught a common butterfly, by means of which they could identify and find out something of the life-history of their newly-found treasure. This want Mr. Scudder has filled with his Brief Guide, in which he treats chiefly of " those butterflies—less than a hundred of them—which would almost surely be met with by any industrious collector in the course of a year's or two years' work in the more populous Northern States and in Canada." Should a young collector, therefore, be lucky enough to capture a butterfly not mentioned in the book, he may be sure that he has taken a rarity, which, as the author remarks, is " a discovery not always distressing to the amateur." The introductory chapters, upon some of the points which will at once present themselves to a beginner, are excellent—concise, clearly expressed and accurate, and treat of such subjects as :—What are butterflies? their structure, habits, variations, and life-histories. There are three keys for identification, based on the perfect insect, the caterpillar and the egg, and pages 63 to 174 are taken up with short accounts, systematically arranged, of the insects treated of. There is a short glossary and an appendix giving instructions for collecting, rearing and studying butterflies.

On the whole this is a very useful little work, well prepared, convenient in size, well printed and well got up. It is, of course, arranged after the same system as Mr. Scudder's great work, " The Butterflies of the Eastern United States and Canada," and many of the views there expressed are repeated here. The nomenclature is also the same, but the names more frequently used by other authors are also given. A good feature of the work is that the proper pronunciation of every name is shown by accents, and a popular English name is given for each species. The author's observations on dimorphism of some species, as of *Colias Eurytheme* and *Papilio Ajax*, do not seem quite to agree with those published by Mr. W. H. Edwards. It would be difficult, however, to treat such subjects fully in the space allotted to each species in this Brief Guide, which, we think, all who use it will agree is too brief, and they would like much more of it, of the same style.—J. F.

Mailed September 9th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, OCTOBER, 1893. No. 10.

WASHINGTON TENTHREDINIDÆ AND UROCERIDÆ.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The specimens on which the present paper has been based were collected by Mr. Trevor Kincaid, of Olympia, Washington. They were all collected near that city except a few, which were taken along the Skokomish River. Great credit is due Mr. Kincaid for bringing together so large a collection. The specimens are deposited in the entomological collection of Cornell University.

TENTHREDINIDÆ.

Trichiosoma † *triangulum*, Kirby.

3 ♂ ♂, June 6, 22, 23, 1892. They agree perfectly with Norton's description of this species, except the apical segments of the antennæ, which are entirely black.

Zarea americana, Cress.

2 ♀ ♀, April 17 and May 23, 1892.

Hylotoma abdominalis, Leach.

1 ♀, May 3, 1892. Skokomish River.

Hylotoma Macleayi, Leach.

1 ♀, May 11, 1892.

Euura abbiricta, Cress.

1 ♀, Skokomish River, May 8, 1892.

Nematus castaneus, Kirby.

A single female, which in all probability belongs to this species, has two broad black bands on the lateral lobes of the mesothorax and two less distinct bands on the median lobe; the square spot on the vertex is fuscous, a small spot between the antennæ and the base of the sinus from

† The following is omitted from Cresson's synopsis. It will probably prove to be a variety of *triangulum* and not the European species.

vitellina, Linn.

1882. *Trichiosoma*, Kirby, List Hymen., Brit. Mus., I., 10.

Habitat.—Vancouver's Island, Rocky Mountains, (Europe).

Digitized by Google

above the antennæ to the clypeus is black; the clypeus is distinctly emarginate, and just beyond the middle of the second submarginal cell there is a small fuscous speck.

Nematus luteolus, Nort.

Two males, which I think belong here, have a broad margin to the abdominal segments; the margin is broadest on the middle segments, almost interruptedly transversely fasciate, the apex of the abdomen and the entire venter honey-yellow.

Nematus, Sp.

There are six species in the collection which are probably new; in the present state of the genus it seems best to leave them undescribed.

Messa atra, sp. nov.

Head, labium, mandibles, antennæ, thorax, abdomen, coxæ except at apex, and femora at middle, black; clypeus acutely emarginate, labium broadly rounded; head and thorax sericeous; middle mesothoracic lobe with a central groove on its anterior half; abdomen black, apical segment above slightly rufous; coxæ black, at apex fuscous; femora at base and apex white, with a broad median black band; anterior and middle tibiæ fuscous, darker beneath, hind tibia black, at base white; spurs fuscous; anterior and middle tarsi at base fuscous, apex black, hind tarsi black; wings hyaline, veins piceous, stigma lighter at base. Length, 7 mm.

1 ♀, April 14, 1892. Related to *salicis*, Ashm., but differs by its rounded labium and black abdomen.

Dolerus borealis, sp. nov.

Body stout, black, except the two lateral lobes of the mesothorax, which are reddish-brown; head, thorax and pleuræ densely coarsely punctured; antennæ slender, third and fourth joints subequal; clypeus deeply emarginate; two feeble longitudinal sinuses on the vertex each side of the ocelli; body densely sericeous, especially around the mouth and on the legs; inner tooth of claw stout, distinct; wings slightly fuscous, veins, costa and stigma black. Length, 11 mm.

2 ♀ ♀, May 22, 1892.

Dolerus sericeus, Say.

3 ♀ ♀, May 11, June 6, 1892, and April 20, 1893. This last specimen measures 12 mm., and the wings are clearer than in typical specimens, but otherwise I can find no distinguishing character.

Digitized by Google

Blennocampa atrata, sp. nov.

Shining black; antennæ as long as head and thorax, third joint more than twice as long as fourth; clypeus truncated, labium small, triangular; femora at apex, front and middle tibia before, hind tibia, except at apex, and basal membrane, smoky white; wings transparent, slightly washed with yellowish, veins, costa and stigma black, transverse marginal nervure received a little beyond the middle of the third submarginal cell. Length, 7 mm.

1 ♀, May 7, 1893.

Monophadnus atracornus, sp. nov.

Shining black, impunctate; head entirely black, apex of clypeus slightly emarginate; antennæ as long as head and thorax, third joint one-third longer than fourth; tegulæ, apex of all the femora, the tibiæ and front and middle tarsi, except at apex, white; apex of all the tibiæ, the apex of the front and middle tarsi and the whole of the hind tarsi, infuscated or black; wings hyaline, slightly smoky, iridescent, costa and stigma brownish; transverse marginal nervure bowed, received near the apex of the third submarginal cell. Length, 7 mm.

2 ♀ ♀, May 18, 1892; April 30, 1893. Most closely allied to *M. tiliæ*, Nort.

Hoplocampa pallipes, sp. nov.

Head ferruginous; antennæ, small square spot between antennæ, apex of mandibles, spot at ocelli, black; clypeus emarginate, labrum rounded; antennæ not pilose or hairy; thorax light ferruginous, prothorax and collar narrowly margined with black, tegulæ and pleuræ testaceous; abdomen short, broad, broadest at middle; the basal plates, the venter, a narrow lateral margin, and the three apical segments ferruginous, the remainder of the dorsum black, in one specimen the basal plates are black; legs entirely ferruginous, sericeous; wings hyaline, veins luteous. Length, 5 mm.

3 ♀ ♀, Skokomish River, May 8th.

Monostegia Kincaidii, sp. nov.

Head, antennæ, labium and mandibles black; face sericeous; antennæ reaching to base of thorax, flattened, third joint scarcely longer than fourth; clypeus slightly emarginate; thorax black, prothorax narrowly margined with white; abdominal segments one to five with basal whitish bands, broadly interrupted at middle, segments three to six very narrowly tipped with white; legs black, apex of anterior femora

Digitized by Google

and tibia beneath white, middle and posterior tibiæ densely sericeous ; wings hyaline, slightly obscure, veins black, costa and stigma brownish, first branchial and second submarginal cells with a black dot. Length, 7 mm.

1 ♂, 7 ♀ ♀, April 17, 1892, on the catkins of *Salix flavescens*, and May 7th, 1893. Two specimens with the venation of *Harpiphorus* probably belong here.

Labidia opimus, Cress.

1 ♂, June 25, 1892.

Macrophya californica, Nort.

Three females, two from the Skokomish River, May 5th, on *Ribes bracteosum*. These specimens do not agree perfectly with Norton's description, but they differ more among themselves than from the description. The interrupted band on the abdomen and the black spot on the hind coxæ are wanting, in one specimen the abdomen is reddish-brown, and the antennæ, except the basal segment, entirely black.

Macrophya oregona, Cress.

1 ♀.—Differs from Cresson's description only in having a small white spot on basal plates.

Macrophya magnifica, sp. nov.

Black ; labrum, clypeus, mandibles, except at tip, palpi, cheeks, an elongate spot on inner orbits above the antennæ, spot beneath the antennæ, the carina above the base of the antennæ, tegulæ, a broad band on collar, subinterrupted at middle, a large spot on each thoracic pleura, the scutellum, lines on the sides of the thorax and at the base of the wings, the edges of the basal plates, a band extending along the edge of the abdomen from the basal plates to the apex of the seventh segment, band broadest on the venter, legs, except a line above and the apex of the posterior femora, which are black, olive-white ; antennæ, sternum, venter except the lateral yellow band, and back of the head, black ; the five apical segments of the abdomen and the saw reddish-brown ; the basal segment of the antennæ large, globular, the third as long as the fourth and fifth together ; wings slightly infuscated, veins black, the costa and stigma at base brownish ; lanceolate cell with a straight cross-nervure. Length, 12 mm.

1 ♀, June 4, 1892.

Digitized by Google

Strongylogaster pacificus, sp. nov.

Female.—Black; head and pleuræ covered with a dense sericeous pile; third and fourth antennal joints subequal; sinus at sides of ocelli almost reaching the back of the head; head and thorax remotely and coarsely punctured, the palpi, the tegulæ, the front angles of the thorax, the coxæ except at base, the trochanters, the front femora, the apical half of the middle and hind femora, the front and middle tibiæ, the basal half and apex of the hind tibia, and the front and middle tarsi, white; abdomen, except the basal plates and the first segment, which are black, honey-yellow; apex of the abdomen with a whorl of black hairs, concealing the saw, the venter honey-yellow, with a narrow black band along each side; wings transparent, their base and the costa yellow, the stigma brown, its lower edge lighter, lanceolate cell without oblique cross-vein, hind wings with two middle cells. Length, 6–8 mm.

Var.—Black markings of the legs less distinct, dorsal abdominal segments 3–5 with a small fuscous spot at middle, segments 6–9 with a transverse black band, covering almost the entire segment, apex black.

Male.—Does not differ except in wanting the whorl of hairs at the apex of the abdomen and in having all the legs white.

14 ♂ ♂, 3 ♀ ♀, May 18–22, 1892; April 30, May 7, 1893; a single male from the Skokomish River.

Strongylogaster primativus, sp. nov.

Female.—Black, antennæ short, third and fourth joints subequal; clypeus and labrum dirty white; head sparsely punctured, thorax impunctate; the tegulæ, the front angles of the thorax the coxæ except at base, the trochanters, the apex of the femora, the front and middle tibiæ (in some specimens slightly clouded), the base of the posterior tibia, and the base of the front and middle tarsi, waxen white; abdomen black, venter and pectus black, the venter margined each side with a yellow band, in some specimens these bands coalesce on the venter and form a narrow margin on the dorsum; wings hyaline, yellowish at base, veins black, the apex of the costa and stigma black, lanceolate cell open, with a perpendicular cross-nervure, in some wings the cross-vein is represented only by points on the longitudinal veins, hind wings with two middle cells. Length, 9 mm.

Male.—Smaller, not so robust, legs whitish-yellow, except the posterior tibiæ and tarsi, which are fuscous; a narrow margin to abdominal segments 2-5, and the apex of the abdomen yellow.

1 ♂ and 15 ♀ ♀, April 20 and May 19-23.

Digitized by Google

Tenthredo Barnstonii, Kirby.

1 ♂, poor condition; the legs are entirely ferruginous, the hind legs are darker than the anterior ones.

Tenthredo nigricostata, Prov.

1 ♀, July 22, 1892. This is probably the same as *erythromera*, Prov.

Tenthredo xanthus, Nort.

1 ♀, May 21st. The light spot above the coxæ and the black lines on the tergum are wanting. There is a black dot above the base of the antennæ.

Tenthredo scaevola, Cress.

2 ♀ ♀, May 7, 1893.

Tenthredopsis transversa, sp. nov.

Black; clypeus white; palpi, tegulæ, collar, narrow elongated spot from tegulæ, apices of the coxæ, the femora, except a black line above, the front and middle tibiæ, a line on the hind tibia beneath, the front and middle tarsi beneath, the venter, a narrow margin to abdominal segments 2–5, and the apex of the abdomen, yellow; the basal membrane and very narrow margin to abdominal segments 6–8, white; the clypeus slightly emarginate, the vertex finely punctured; the thorax impunctate; antennæ long, slender, black, segments 3–5 equal; wings transparent, veins black, costa and stigma lighter at base; hind wings with two distinct middle cells. Length, 8 mm.

2 ♂ ♂, May 18, 1892; May 7, 1893.

Tenthredopsis ruficorna, sp. nov.

Black; the clypeus, the labrum, the mandibles, except at tip, a spot between the antennæ, two spots above the antennæ, the cheeks, a broad postocular band, an interocular band, broader from opposite antennæ below, continued narrowly to the postocular band, the prothorax, tegulæ, a spot below the tegulæ, a trapezoidal spot on pleuræ, a spot above posterior coxæ, a slender line above this spot, front and middle coxæ, and posterior coxæ, except two longitudinal black lines, waxen white; antennæ, except two basal joints, black, honey-yellow above; cenchri, abdomen, except immediate base of basal plates, and legs, except coxæ, honey-yellow; clypeus scarcely emarginate, labrum rounded; segments 3–5 of antennæ subequal; wings yellowish-hyaline, veins fuscous, costa and stigma honey-yellow; hind wings with one or two middle cells. Length, 11 mm.

Digitized by Google

1 ♀, May 22, 1892. This may prove to be a variety of *Tenthredo ruficoxa*, Prov.

Lyda olympia, sp. nov.

Ferruginous, shining; segments 10–24 of antennæ, spots at base of antennæ and narrow line between, beneath the ocelli, prothorax, metathorax above and on sides, basal plates, the sutures of the venter, and the apex of the abdomen, black; cheeks, clypeus, interior orbits and between the antennæ, yellowish; antennæ twenty-four-jointed, first and third segments subequal, third segment three times as long as fourth; posterior femora infuscated at base, otherwise the legs entirely ferruginous; front tibia with a single side spur; wings yellowish-hyaline, veins yellowish, stigma darker at base, third submarginal cell broader and slightly longer than second, second branchial cell without cross-nervure; hind wings with apparently three closed cells. Length, 14 mm.

1 ♂, June 11, 1892. This may be *bucephala*, Cress.

UROCERIDÆ.

Oryssus occidentalis, Cress.

1 ♀, the head is wanting, but the specimen without much doubt belongs to this species. The two basal abdominal segments are black.

Urocerus albicornis, Fabr.

1 Female.

Urocerus apicalis, Kirby.

1 ♂. The last dorsal abdominal segment is flattened.

Urocerus Behrensii, Cres.

1 ♀, probably belongs here, the wings are entirely fuscous, the apex of the antennæ and all the tarsi are yellow.

Urocerus flavipennis, Kirby.

3 ♀ ♀. One from the Skokomish River, Aug. 7. Only one specimen has the spots on the side of the abdomen, another has the antennæ entirely yellow.

Urocerus indecisus, sp. nov.

Antennæ, head, thorax, basal plates, first and apex of the last abdominal segment, a band each side below, and all the legs except the two apical segments of the tarsi, black; the remainder of the abdomen and tarsi brown; antennæ twenty-two-jointed; wings slightly fuscous, the veins black, the second transverse cubital vein with a stump of a vein on the inner side; cornus long, suddenly narrowed at apex, apex with several teeth. Length, 16 mm.; alar expanse, 26 mm. 1 ♂.

Digitized by Google

Urocerus riparius, sp. nov.

Black; clypeus, labrum, mandibles except at tip, spot behind the eye, joints 3-9 of the antennæ, prothorax, apex of the front and middle femora, their tibiæ and tarsi, the base of the hind tibia and metatarsus, the two apical segments of their tarsi, and abdominal segments three to six, yellow; antennæ twenty-one-jointed, the yellow band on the antennæ is clouded with fuscous and varies in width; wings yellow, slightly clouded, veins black. Length, 22 mm.; alar expanse, 33 mm. Two males, one from Skokomish River, May 3.

DESCRIPTIONS OF THE LARVÆ OF CERTAIN TENTHREDINIDÆ.

BY HARRISON G. DYAR, NEW YORK.

Hemichroa americana, Provancher.

(The alder saw-fly).

Described as a Dineura, but the lanceolate cell is contracted in the middle, not petiolate. The second recurrent nervure is received very near the end of the second submarginal cell, almost at the intersection of second and third submarginal cells.

♂.—Shining black, the legs brownish-yellow, all the coxæ, the apical third of posterior tibiæ and posterior tarsi black. Wings smoky, but hyaline along the outer margin. Nervures and stigma black.

♀.—Head and body yellowish-brown; antennæ, eyes, metathorax and legs as in the ♂, black, or all the femora more or less black. Black markings somewhat variable.

A smoky spot in the centre of the second submarginal cell in both sexes.

15 ♂ ♂, 8 ♀ ♀.—Bred from larvæ on *Alnus serrulata*, at Woods' Holl., Mass., and Rhinebeck, N.Y.

Eggs.—Laid in saw cuts opening below on the petiole and base of midrib of a leaf. The cuts are in one or two rows, along one or both sides of the rib, nearly contiguous.

First stage.—Eating a little hole or slit through the leaf. Head rounded, higher than wide, pale brown, eye black; width, 0.3 mm. Body curved into an S shape outside of the hole in the leaf, through which the larva readily moves. Translucent honey-yellow, annulate, scarcely shining; the alimentary canal gives a greenish tinge by transparency.

Digitized by Google

Second stage.—Much as before. Width of head, 0.4 mm. Body rather dark honey-yellow, greenish tinged. Two transverse rows of subconical tubercles are seen on each segment, bearing minute setæ which are blackish.

Third stage.—Head brown, shining, eye black, mouth dark; width, 0.55 mm. Body greenish-yellow, rather sordid and only slightly shining. Thoracic feet slightly marked with black and traces of lateral and broken substigmatal black lines appear, most distinct centrally. Setiferous tubercles blackish.

Fourth stage.—Head minutely pilose, blackish-brown, eye black; width, 0.75 mm. Thoracic feet pale. Body marked as in the next stage, but the tubercles are larger in proportion, and the subventral black patches are rounder and more evidently cover the anterior and posterior patches of tubercles.

Fifth stage.—Head brownish-black; width, 1.0 mm. Practically as in the next stage. The body tubercles are tinged with brownish.

Sixth stage.—Head well-rounded, slightly acute at vertex, not conspicuously flattened before; shining black, sparsely pilose; width, 1.4 mm. (or as large as 1.7 mm. in some ♀ ♀). Thoracic feet spreading, black, pale at the joints. Abdominal feet present on joints 6–12 and 13 posteriorly (22 feet). Body smooth, subannulate or creased, not shining. colour subtranslucent greenish-ochre, with an even, continuous, black lateral line, and a geminate interrupted subventral one. Two transverse rows of smooth, inconspicuous, concolorous, setiferous tubercles on each segment, of moderate size and arranged subventrally in the black patches in clusters. Venter pale. Joints 2 and 13 posteriorly of a darker ochre. The larvæ rest on the edge of a leaf, and lash the posterior part of their bodies vigorously when disturbed, holding on to the leaf by the thoracic feet.

Seventh stage.—The larvæ do not feed in this stage, but enter the ground soon after moulting. Head as before, its width the same (1.4-1.7 mm.) Body much the same, but smooth. The tubercles are represented by elliptical watery areas in three rows on each segment, with rudimentary setæ. The colour is a rather opaque yellow, with no shade from the alimentary canal. The black marks are the same.

Cocoon.—Formed beneath the ground; thin, crusty and brittle; elliptical and of uniform texture, brown in colour. Size, 8x4 mm.

Digitized by Google

Pupa.—Much like the mature insect, but with rudimentary wings. All brownish-yellow, the legs, cases and antennæ darker, eyes blackish.

The flies emerged in August.

Cræsus latitarsus, Norton.

(The white birch saw-fly.)

Eggs.—Laid closely along the midrib or larger veins on the under side of the leaf, about half enclosed in median saw-cuts which are distended by the eggs so that they lie obliquely in contact. Soft, translucent white; seen to be very minutely punctured under a magnification of 60 diameters. Size, 1.4x.6 mm.

First stage.—Eating holes through the leaf, which soon become confluent; lashing the body. Head round, a little higher than wide, full at vertex; shining black; width, 0.4 mm. Body light shining greenish. Tubercles very obscure, not setiferous, only the subventral ones distinct and nearly concolorous. Thoracic feet blackish; the segments of body obscurely annulate.

Second stage.—Head very smooth, even brownish-black, pale above the mouth; width, 0.55 mm. Body olive-green, the subventral ridge and feet blackish. No setæ seen.

Third stage.—Head black; width, 0.75 mm. Much the same.

Fourth stage.—Head, 1.05 mm. wide. Markings much as before.

Fifth stage.—Head round, full at vertex, well rounded, not pointed, without trace of sutures; flattened in front over clypeus, with a few slight clypeal dents. Entirely shining black; width, 1.6 mm. Body indistinctly 4-annulate, watery shining smooth; no dots, but minute black setæ represent them. Thoracic feet large, spreading, black, pale centrally. Abdominal feet present on joints 6-11 and 13 (20 feet), with a medio-ventral eversible gland, posterior to each pair on joints 6–10. These glands are longer than the feet, when everted, are coloured rather darker than the body. When disturbed the larva throws its body up over its head and the ventral glands are quickly everted and retracted. Ground colour honey-yellow heavily shaded with greenish black, the yellow appearing on joint 2 anteriorly, stigmatally and on the abdominal feet.

Sixth stage.—Width of head, 2.2 mm. As before, but smooth; no setæ seen. Joint 2, the dorsal and stigmatal irregular bands and abdominal feet honey-yellow, leaving the black shading most distinct subdorsally

Digitized by Google

and substigmatally, forming a series of very black subdorsal patches or spreading largely over the body. At the end of this stage the larva enters the earth without moulting.

Cocoon.—Formed beneath the ground; elliptical, rather thick, firm, opaque, black. Size, 11 x 4.5 mm. Imagos appeared August 1. Larvæ found on the leaves of *Betula populifolia* at Woods' Holl., Mass., and Plattsburgh, N. Y.

Fenusa varipes, St.-F.

(The imported alder leaf-miner.)

Abundant on *Alnus serrulata* at Woods' Holl., Mass., causing the leaves to turn brown and fall.

Egg.—A slight circular swelling in the leaf, visible on both surfaces, 0.5 in diameter. The egg is thin, delicate, milky white, about 0.3 mm in diameter, inserted under the epidermis by a saw cut.

First stage.—Mines under the upper epidermis usually less than 1 mm. in diameter, rarely as large as 1.5 mm., starting from the egg puncture. Head much flattened, broader than long, mouth parts projecting, the lateral lobes bulging, pale watery brownish; width, 0.25 mm. Body flattened, deeply incised, joint 2 wide, joints 3–4 rapidly tapering, the rest of even width, joint 13 rounded. Feet imperceptible with a lens. Colour translucent watery, scarcely whitish, alimentary canal green. Length, 1 mm.

Second stage.—Like the preceding stage, but thoracic segments larger and body more deeply incised. Milky translucent, the alimentary canal green, head brownish, 0.3 mm. wide. Feet very rudimentary, but visible. Cervical shield present, large, not very distinct. Burrow about 3 mm. diameter.

Third stage.—As before. Width of head, 0.4 mm.; diameter of burrow, about 6 mm.

Fourth stage.—Much as in the next stage. Cervical shield covering the anterior half of joint 2, very faintly brownish, as are the thoracic feet. Head rather paler than in the next stage, 0.55 mm. wide. Burrow about 10–12 mm. in diameter.

Fifth stage.—Head much flattened, mouth projecting in front, clypeus occupying the central third of what is the upper surface; lobes rounded, projecting laterally; ocellus nearly central. Colour honey-brown, paler, almost whitish toward vertex, which is withdrawn beneath joint 2; mouth dark brown, eye black; width, 0.75 mm. Abdominal feet very rudi-

Digitized by Google

mentary, present on joints 5-12 (none on joint 13). Thoracic feet small, almost lateral, indistinctly jointed, faintly brownish, not used. Body flattened, rounded, of nearly even width, segmental incisures distinct and broad, segments faintly 3-annulate. Colour shining whitish, subtranslucent, the alimentary canal green. No anal plate, but a very large, bisected, brownish cervical shield. No tubercles nor setæ distinguishable. Burrows large, spreading from 28-35 × 14-9 mm., often becoming confluent with others over the whole leaf, transforming the upper surface into one continuous brown blister.

Sixth stage.—On attaining this stage the larvæ burst through the upper epidermis and fall to the ground, eating nothing after the moult. Head slightly darker than body, shining, mouth brown, eye dark brown; width, 0.75 mm. Body shining pale yellowish-white, with no discolorous shade from the alimentary canal. On joints 5-12 two watery transverse areas on each segment, the anterior composed of two dorsal dots, the posterior of two elongate pyriform subdorsal patches, slightly elevated and connected over the dorsum. Feet concolorous. Length, about 5.5 mm.

Pupa.—Formed in an elliptical cell in the ground; entirely pale yellowish, the eyes brown-black.

(TO BE CONTINUED.)

DESCRIPTION OF THE PREPARATORY STAGES OF NEMEOPHILA SCUDDERI, PACK.

BY H. H. LYMAN, MONTREAL.

Eggs laid July 9-10. Round, considerably flattened at base, honey-yellow, shining, under a microscope very slightly and irregularly pitted, $\frac{1}{88}$ of an inch in diameter.

Hatched July 17-18, egg period eight days.

Young larva.—Length, about one-tenth of an inch. Head brown, rather lighter below. Body, dull greenish-yellow, with lead coloured warts and long hairs of a brown colour.

I failed to observe the first moult, but the following description was taken on August 16th, just before what I believed to be the second moult. Length, $\frac{1}{8}$ to $\frac{3}{8}$ inch. Head small, slightly and obtusely bilobed, black and shining, with a few hairs about mouth parts.

Body above generally dark, but occasionally rather light in colour, with 10 or 12 warts on each segment. These warts are round, black and

Digitized by Google

shining, clothed with dense tufts of black hairs, mixed with reddish-brown ones on the top of the 5th to the 9th segments. Below greenish-black, feet and prop-legs concolorous and semi-transparent.

After second moult.—Length, ⅜ to $\frac{7}{16}$ inch. Same as before, except that the skin is blacker and there are some rather long tufts or pencils of hair on the hind segments, and there is a patch of foxy hair on the top of the 5th, 6th and 7th segments. Feet black.

After third moult.—Length, ⅝ to $\frac{11}{16}$ inch. Head black, slightly and obtusely bilobed.

Body black, the warts, 10 or 12 on each segment, are black and shining, and arranged in a transverse row of 10, with two in front of the general line in the middle, thus . . . . . The warts are furnished with radiating tufts of bristles, which are either black, foxy-red or yellowish, according to their position. Those on the top of the 5th, 6th and 7th segments are foxy-red, and those on the two lowest lateral rows of warts and the lower hairs of the third row are of a yellowish-brown colour. The rest of the hairs are black, and those towards the anal extremity are rather longer than the others. Feet black, prop-legs dark, with a small wart, with a few short bristles on the outside of each; segments without prop-legs have small warts underneath.

Passing 4th moult September 6th.—

After fourth moult.—Length at rest, ¾ inch; in motion, ⅞ inch. Colours the same as before, but with more foxy-red, which now extends from the 5th to 9th segments inclusive, and is not confined to the top, but extends down to meet the lighter coloured hairs along the sides, so that the black hairs are confined to the upper part of the 2nd to 4th and 10th to 13th segments, and a few along the sub-dorsal region on the 7th to 9th segments.

Began spinning up about 14th September. A very slight cocoon is made by drawing together leaves or frass with a few threads, and some of the hairs from the body woven in. In this the caterpillar lies sluggishly for several days before casting its skin and becoming a pupa.

Pupa.—Length, ½ to ⅝ inch, rounded head and pointed tail, dark brown in colour.

So slight were the cocoons that nearly all the pupæ slipped out of them.

Though most of the larvæ went on to pupation, a few seemed determined to hibernate full grown, and so were placed in a box in an outhouse, but did not survive.

Digitized by Google

On 9th October I left home for a few days, but before doing so placed the pupæ in the cellar, as I did not expect the imagos to emerge till spring; but on examining the cage on 22nd October, after my return, I found that two or three had emerged in a crippled condition. I thought this might be caused by the dryness of the house, so tried to moisten the air by putting a wet sponge in the cage and in other ways, but they still continued to emerge crippled, and some only partially emerged.

On the 29th October I found one which had emerged, but the right wing cover was still adhering to the wing. I removed it with difficulty, many of the scales coming off with it, but none of the wings developed at all.

Mr. Winn suggested that perhaps the trouble arose from the absence of the cocoon, slight as it is, and I therefore tried the experiment of placing the pupæ in empty cocoons of *Halesidota caryæ*. This seemed to improve matters, and I succeeded in getting a few perfect specimens. One perfect female emerged and was left in the cage with two males for two days, in the hope of securing another lot of eggs, a large box of plantain having been brought into the house for feeding purposes. I was unable to watch these specimens, but as I did not suppose that a virgin female could pass two days with two males without being impregnated, I put the males in a cyanide bottle and the female in a pill box. A supply of eggs was secured, but they proved to be sterile.

About a dozen of the pupæ enveloped in the Halesidota cocoons, showing no sign of disclosing the imagos, were later placed again in the cellar in the hope and expectation of their maturing in the spring, but all were found to be dead on the return of that season. The larvæ fed readily on plantain, but were at all times very slugglish. Unlike most larvæ with which I have had anything to do, the faces were not cast in moulting in the usual manner, but remained attached to the skin.

In one case which was watched, the skin split along the side of the fore-part of the body. The larva rested for a time, and gathered strength for a further effort. The skin split further along and the larva again rested. Another effort, and the head was withdrawn, and then the caterpillar struggled out of the old skin. Immediately after the casting of the old skin the head and warts are honey-yellow, the latter with black points, and the skin is translucent, but dark in colour. The bristles are rather matted together, the tufts on top usually crossing each other, the under

Digitized by Google

surface is decidedly light. The hairs, which later became foxy-red, are then light-coloured.

This species was described as Nemeophila Selwynii, by the late Henry Edwards, in CAN. ENT., XVII., 65, but there can, I think, be no doubt that it is identical with that described in Proc. Ent. Soc., Phil., III., 113, by Dr. A. S. Packard, under the name of Plactarctia Scudderi, as follows :—

"♂.—Brownish-black. Sides of the prothorax, orange. Two whitish bands on the forewing; one lying just under the base of the median nervure, as long as the thorax; the other transverse running from just above the internal angle to the outer third of the costa. The middle of the patagia is whitish, and there are two curved narrow lines on each side of the meso-scutum. The tips of the palpi, and the ends of the femora above, and the tibiæ and tarsi are very pale yellowish-white, concolorous, with the bands on the thorax and primaries.

Secondaries entirely brownish-black, and concolorous with the forewings.

Length of body, .45; length of primaries, .65 inch."

Mr. Scudder's specimens were collected on the Saskatchewan River, but the best known locality is Nepigon, on the north shore of Lake Superior.

When I visited that place in 1890, July 9–11, in company with Mr. Fletcher, this species was just in season and fairly abundant, and I obtained over a dozen specimens in fine condition.

It is, however, a most difficult species to collect in good order, as the scales come off so easily that if two are in the cyanide bottle together, they damage each other immediately.

I do not think that the fact of so many of these larvæ passing through all their stages during the one season at all indicates a second brood under natural conditions, as their transformations were doubtless accelerated by being brought to a milder climate and kept in the house.

Last year Mr. Fletcher again visited Nepigon and secured eggs of this species and bred it to imago, and has informed me that while one specimen completed its transformations that season and gave the moth in the autumn, the rest of them hibernated when two-thirds grown on the surface of sod merely hidden beneath the leaves, close to the ground, but without any silken tent or cocoon. After awakening in the spring and before eating they measured exactly ⅝ of an inch (average).

Mr. Samuel Henshaw kindly compared for me a specimen from Nepigon with the specimens in the Cambridge Museum, and found that while

Digitized by Google

the specimens varied slightly in regard to the whitish transverse band on primaries, which is a variable feature, in other respects, both colorational and structural, as far as they could be compared they did not differ.

In extenuation of the insufficiency of my notes on the earlier stages, I would say that the larvæ were carried all across the continent and back again to Montreal.

A NEW SPECIES OF OLIGOLOPHUS.

BY NATHAN BANKS, SEA CLIFF, N. Y.

Very few Phalangids have been collected on our mountains, and so it is not surprising that a new species of a genus which in Europe lives in high altitudes should be found on Mt. Washington, New Hampshire. Early in September, 1893, Mrs. Annie T. Slosson kindly sent me several vials of arachnids from the White Mts., and among them a vial from Mt. Washington containing six specimens of a beautiful new species of Oligolophus. It differs from the other American species which have been referred to that genus in lacking spines to the femur of the palpus, thus resembling some alpine European forms.

Oligolophus montanus, nov. sp.

Length—♂, 4.5 mm.; ♀, 7. mm.; femur I., 2.5 mm.; femur II., 5. mm.; leg II., ♂, 30. mm.; ♀, 27. mm.

Cephalothorax without the median points, but with some small denticles in front of the eye-tubercle, a sublateral row each side, a few just behind the lateral pore, two or three on the margin a little further along, some at the posterior angle, one or two at the side of the eye-tubercle, a transverse row on an elevated ridge just behind the eye tubercle, and on each abdominal segment about nine denticles. All these denticles are black and arise from little white pits. The eye-tubercle is not large, canaliculate, and with two rows of about five denticles above. The palpi are clothed with short, stiff, black hairs, but no spines. The femur cylindrical, slightly curved, and enlarged at tip on the inner side; patella about half as long as femur, but broader and a little swollen at tip; tibia similar to patella, but a little longer; tarsus much more slender, a little curved, and about as long as tibia and patella together, claw smooth.

Legs short, the fourth pair about as long as the second, no false articulations in any of the tibiæ; metatarsus I. with two false articulations; the superior edges of coxæ I., II. and III. each bear a spine; the trochanters have some denticles on the anterior and posterior sides, the femora have about five rows of denticles; and there are two rows on

Digitized by Google

the under side of tibia I. in the ♂; the legs have many short hairs, and there are small spines at the ends of the joints.

The dorsum is dirty-white or gray, with a broad brown or blackish vase-mark. On the cephalothorax, the vase-mark covers nearly the whole surface; on the abdomen it grows narrower on the second and quite suddenly enlarging on the third segment; then gradually narrowing to the tip of the abdomen. The white or gray of the sides contains a few black spots. Venter dirty-white, with black spots; legs pale yellowish-brown; mandibles white, with a large brown spot above on the basal joint, and some smaller ones on the second joint. Femur of palpus almost wholly brown, some small spots on patella and tibia, tarsus pale.

The outline of the vase-mark from the cephalothorax to the enlargement on the abdomen is very sharp and distinct, and in the darker specimens it is bordered with white. Sometimes there is a paler stripe through the vase-mark.

Locality—Mt. Washington, New Hampshire; collected by Mrs. Annie T. Slosson.

NOTES ON A POLYMORPHIC PAPILIO.

BY WM. H. EDWARDS, COALBURGH, WEST VA.

For two or three years past Mr. David Bruce, in S. W. Colorado, has been taking *Papilio Bairdii* in company with a very different form, *P. oregonia*, as we have called it, and also with the form I described recently as *P. Hollandii*, which last is in general like *Bairdii*, but has the abdomen either with a broad stripe of yellow or almost completely yellow, instead of spotted yellow in rows, as in the *Asterias* group, and as in typical *Bairdii*. And from what Mr. Bruce has seen on the ground, he has become satisfied that all these three forms are but one species. It is a remarkable case of polymorphism, the more so that it is not confined to one sex only, and that the two main forms belong to what have been considered two different sub-groups, namely, *Bairdii* to the *Asterias* group, and this *Oregonia* to the *Zolicaon* and *Machaon* group. Of course, breeding is the final test in such a case. In 1892, Mr. Bruce obtained a large number of eggs from a ♀ of *Bairdii* confined over the food plant. This, by the way, is not one of the umbelliferæ, but of the compositæ, a strange plant for butterflies of either of these sub-groups to deposit their eggs on, *Artemisia dracunculoides*. And both these forms lay on it, passing by the umbelliferæ every time. Yet, the larvæ in confinement

Digitized by Google

have been reared on carrot, fennel and parsnip. The eggs spoken of hatched before Mr. Bruce left Colorado in September, and he brought the larvæ to his home at Brockport, N. Y., and enclosed them over a bed of growing carrots in his garden, under a wire gauze screen or box. In this way he got upwards of forty pupæ, but discovered soon that almost all had been stung by *Asterias* parasites. Out of the lot there were but three healthy pupæ, two of which produced *Bairdii* in the spring of 1893, and one a ♀ *Oregonia*, which Mr. Bruce sent me. But a few of the larvæ when half grown had been sent to Mrs. Peart, near Philadelphia, and from these she got four pupæ. These yielded in spring of 1893 one *Bairdii* and one very large and well-marked ♀ *Oregonia*, which also I now have. The other two pupæ are going over to 1894, as is often the case with the western Papilios, they running in the pupa stage for two years.

In 1893 Mr. Bruce was again upon the ground, and devoted his time largely to getting at the facts in this case. On the 23rd July he sent me two eggs of the *Oregonia*, as before, laid by a confined female. I sent one to Mrs. Peart, and she reared the larva and got a pupa 23rd August. Out of this, 8th September, came a ♂ *Bairdii*. The other egg produced a larva which died soon after third moult.

On 7th August, Mr. Bruce sent me twenty-four eggs of the *Oregonia*, obtained as before. The larvæ from these died off rapidly, and at all stages: seemed not to like their food. I treated them exactly as I have heretofore treated larvæ of Papilio, but I obtained only five pupæ. Some of the larvæ were certainly killed by the others, their bodies sucked dry, and this indicated, I think, a dislike to the food given. From the five pupæ up to date (21st September) have emerged four *Bairdii* imagos, 2 ♂, 2 ♀.

Thus imagos of *Bairdii* have come from eggs laid by the *Oregonia*, and in two instances *Oregonias* have come from eggs laid by *Bairdii*. As to *Hollandii* none of the *Bairdii* so far obtained are of that form, and its relationship to *Bairdii* is still but a matter of conjecture.

I am not satisfied that the form we are calling *Oregonia* is identical with the type form found in Oregon and Washington; am inclined to think it is not, and intended to propose the name *Brucei* for it. But, until more examples of the real *Oregonia* can be seen, I can come to no final conclusion.

I must not omit to say that at all stages the larvæ of these two forms are indistinguishable.

Digitized by Google

THE CLOVER-LEAF WEEVIL, PHYTONOMUS PUNCTATUS (FABR.) IN ITALY.

BY F. M. WEBSTER, WOOSTER, OHIO.

When Dr. J. A. Lintner prepared his first annual report in 1882, he, with the aid of Drs. Hagen and Le Conte, failed to discover any record of the clover-destroying habit of this species in Europe, and it was supposed at that time that this was a newly acquired habit, and occurring only in this country. Indeed, Dr. Le Conte failed to learn anything whatever in regard to the food habits of this species. As it has now entered into the Mississippi Valley and is rapidly pushing its way westward, it will be of interest to those who will have to deal with it in future to know that its taste for clover was not of American origin, but had been observed in its native home many years ago. It is a matter of surprise to me that nothing is said, by Italian observers, that gives the least hint of injury by the larvæ, which is, with us, by far its most destructive stage. Nor do I find that Sig. Piero Bargagli, from whose very useful work, *Rassegna Biologica di Rincofori Europei*, I have taken the following extract, anywhere mentions the larva of this species, which he considers under the name *Hypera punctata*, Fab.

Here in Ohio, I find that the larvæ prefer the white clover to the red, and some unsatisfactory observations of mine, made quite recently, make me feel rather suspicious that the food of the adult may include plants other than clover. At Chautauqua Lake some years ago, I observed the adults in quite numbers floating about in the water, into which I supposed they had either dropped or been blown from the trees. But if this were so, what were they doing there?

(From Rassegna Biologica di Rincofori Europei, p. 97-8, 1883-87.)

During the years 1867–70, *Medicago sativa* and *Trifolium* were very much damaged in Lombardy and Bologna by this insect; and on the 4th of June, 1868, Mr. Antonio Villa, in *Relazione sugli insetti che devastano il Trifoglio, Milano, 1868*, and again in *Sull' insetto distruttore del Trifoglio, Milano, La Lombardia, 13 giugno, 1868*, directed the attention of the agriculturists of the district of Milan to the damage proven to have been done in the districts of Melegnano and Creme, attributing the extraordinary development of this species to the remarkable drouth, followed by excessive heat, causing the destruction of carnivorous insects which were hostile to this and other species. Various remedies were

Digitized by Google

employed for destroying the pests, among the most successful being the flooding of the meadows, rolling after the cutting of the clover, and, finally, collecting with small bags or nets.

In his second article, the eminent Mr. Villa stated the fact that, in the appendix to the work of Génè *(De quibusdam insectis Sardiniæ novis au. minime cognitis, Mem. R. Accad. Sc. Torino, Ser. I., Vol. 39, Ser. II, Vol. I.)*, which had been prepared by Prof. Moretti, this species had been mentioned as among those having damaged clover. In pointing out how this insect had destroyed clover, Mr. Villa expressed the belief that an earlier attack had occurred, between the years 1834-35, in which the injuries done were similar in character to that of this species. The Station of Agricultural Entomology at Florence received notice, in June, 1879, that this insect had, in the Commune of Ferrara Erbagnana, destroyed a field of 5 ettari (about 11⅓ acres) in extent. (See *Relazione intorno ai lavori della Stazione Entomologica agraria di Firenze*, by *At Targioni-Tozzetti*, in *Annali di Agricoltura del Ministero di Agricoltura e Commercio, Roma, 1879.)*

In the neighbourhood of Florence, besides having been found in the clover in spring, it was, nevertheless, observed in the winter among moss at the base of trees, and, though hibernating, during warm, sunny days would come forth and bask in the sun.

CORRESPONDENCE.

CHALCID PARASITE.

Sir,—I would like to record the occurrence of the following Chalcid parasite :—

Bred from eggs of *Ianassa lignicolor*, Walker, on oak *(Quercus alba)* forty-five examples of

CHAETOSTICHA PRETIOSA, Riley.

1879, Riley, CAN. ENT., xi., 161.

minutissimum, Packard.

1883, Pack., Proc. Bost. Soc. Nat. Hist.., xxi., 37.

The insects varied in length from .35 mm. to .65 mm. In the males the abdomen was often black banded above or largely black. They appeared during the first part of August. Bred at Woods' Holl., Mass.

HARRISON G. DYAR.

Digitized by Google

CARTEROCEPHALUS PALÆMON.

Sir,—Mr. Thomas E. Bean, in an interesting article in the June number for this year, points out the identity of *Carterocephalus mandan*, Edw., and *C. palæmon*, Pall. I think he has well proven his position, and in the proper way, which is by a study of the geographical distribution, which will always show the intergrades between the two extremes of the series. The *Palæmon* of Middle Europe and the *Mandan* of the White Mountains of N. H. look different enough, but when the series is completed by material found between the two extremes there can no longer be a doubt as to their identity. In the species that fly from the Atlantic to the Pacific, and that also exist in Europe, it will be found that the Pacific Coast examples are far closer to the European ones than those individuals found on the Atlantic slope. (See Ent. News, Vol. I., p. 84.)

The fact that *Mandan* was identical with *Palæmon* was pointed out by Moschler in *Verhandlungen der Zoologisch-botanischen Gessellchaft in Wien*, Vol. 34, 1884, p. 283. My attention was called to this synonymy by Prof. E. Bergroth, of Tammerfors, Finland.

DR. HENRY SKINNER, Philadelphia, Pa.

VARIETY OF PRIONOXYSTUS ROBINIÆ.

Sir,—In looking over my specimens of this common moth, I find a singular form that I never met with before, nor do I know of any description that has appeared in any entomological publication of a varied form of *P. (Cossus) robiniæ*, unless it may be Walker's *plagiatus*, of which I have not seen the original description. The example that I wish to make note of is a female, and differs from the regular form only in the following respects :—The whole of the sub-central inner space of the secondaries, "edging on the discoidal cell," is semi-transparent orange, similar to that which is so characteristic of the male, but it is not quite so intense in brightness of colour. The specimen is in fine condition, and is unique in appearance, when I compare it with the many examples that I have taken during the past season and previously ; hence I feel convinced that the form is remarkable enough to be burdened with a name of its own. I propose, therefore, to give it the name *P. robiniæ*, var. *quercus*, because the species is not restricted to the extermination of *Robinia pseudacacia* alone, but also does great damage to *Quercus alba, rubra and coccinea*. I have also found the pupa shells protruding from the trunks of *Fraxinus sambucifolia* in the same locality.

GEORGE A. EHRMANN, Pittsburgh, Pa.

Digitized by Google

OCNERIA DISPAR.

Sir,—I wish on behalf of the Entomological Society of Ontario to acknowledge the receipt of a box from Prof. C. H. Fernald, Ph. D., containing a complete life series of the Gypsy moth, *Ocneria dispar*, Linn., which the State of Massachusetts is making such a praiseworthy and heroic effort to exterminate. The exhibit is gotten up under the direction of Prof. Fernald, by order of the Gypsy Moth Committee, with a view to extending a knowledge of this most destructive insect. It consists of an egg mass as deposited by the female moth on the twig of a tree; two eggs exposed to view; six caterpillars, ranging from one that had just escaped from the egg to the full-grown larva, beautifully mounted; a male and a female pupa; a male moth with the wings spread, also one with the wings unspread; a female moth with the wings spread, and one unspread. A most instructive and important contribution to the Society's collection. J. ALSTON MOFFAT, Curator.

NEW LOCALITIES FOR PAPILIO HOMERUS.

Sir,—It will doubtless interest your readers to know that, notwithstanding the fact that *Papilio homerus* has thus far only been accredited to a very limited habitat in the island of Jamaica, mainly along the valleys of the Sulphur and Devil's rivers, I have recently seen it in several localities in the *terra incognita* in the highland regions of the republics of Haïti and Santo Domingo. The mountain regions of the island known to Columbus as Espanola, or Hispanola as we have it, and which is now without a name as a whole—Haïti being the name of the French-negro republic to the west and Santo Domingo of the Spanish-negro republic to the east—are practically unknown to whites, many considerable areas never having been trodden by white men since the sanguinary expulsion of the French a century ago.

On a recent trip through this interior, in the interests of a newspaper syndicate, I visited a number of localities where there was growing the large creeper, apparently belonging or allied to the genus *Ipomœa*, which I had previously discovered was the food-plant of *Homerus*, and I was not, therefore, at all surprised to occasionally see examples of this most magnificent member of its genus sailing grandly overhead. I have no doubt that the patient collector who will go up into the Cibas range and carefully explore the deep ravines of the western slopes will be rewarded with a goodly number of this valuable species. *Homerus* is most difficult of

Digitized by Google

capture, its high flight and grandly rapid movements making it more of a problem in that respect than most of its moisture-seeking congeners. But the market value of the insect is such that, taken in connection with others to be captured in that region (*P. Machaonides* being among them), patience and hard living are sure to be well paid for. Should any collector feel like attempting such a trip into the heart of that Vaudoux-ridden region, I shall be glad to offer such suggestions as may occur to me as useful to him. I shall also be glad to hear from entomologists who are interested in the insect fauna of the Andean water-shed of the Amazon tributaries, in Bolivia, Peru and Brazil, a region which I propose visiting at an early date. Letters addressed as below will be promptly forwarded to me.

EUGENE MURRAY AARON,
Care of Geographical Magazine,
79 Nassau St., N. Y.

ARGYNNIS EGLEIS.

Sir,—With this I send you a piece of pine-cone with an egg of *Argynnis Egleis* on it. Yesterday, August 8th, being an unfavourable day for collecting *Parnassius Clodius*, I went in an aimless way to find a new collecting ground. When passing along the brow of a rocky slope, I came to a *Pinus Murrayana* tree (also called *P. Contorta*), and saw a female *A. Egleis* walking over sticks and burs that were lying on the ground beneath this tree. I halted for a moment to watch her, as she gave all the outward signs of a desire to oviposit; I had not to wait long, for she walked to a pine-cone and, seizing it with her legs, curled her body and fastened on an egg as far under the cone as she could reach. She then flew about two feet and oviposited twice in succession under a stick on a small stone, and on the piece of cone that I am sending you herewith. As I was standing almost directly over her, she flew to my left foot and oviposited several times under the shadow of my instep; she came and went several times to repeat her work. I lost a day's collecting, but felt amply repaid by the novelty of the knowledge I acquired. What the next female will teach me I cannot conjecture, but trust it will be no less surprising and interesting to the butterfly-loving world.

J. B. LEMBERT,
Summit of the Sierra Nevada, Cal.

[The egg arrived safely and duly hatched out; it will evidently hibernate without feeding.—Ed. C. E.]

Digitized by Google

PAPILIO CRESPHONTES.

I was much surprised at capturing a specimen of this Southern butterfly at Roach's Point, Lake Simcoe, on the 28th of August. The locality is about fifty miles north of Toronto, and is probably the most northern point that the butterfly has reached. The specimen was worn and somewhat damaged, but another nearly perfect one was seen and chased, but escaped capture.

C. J. S. BETHUNE.

THE GOLDEN HEPIALUS.

Sir,—I have made one very interesting capture this season—*Hepialus auratus*, Grote. This rare moth was taken early in July, at Lonesome Lake, in the Franconia Mountains, about 3000 feet above the sea.

In this quiet, lonely spot Mr. William F. Bridge and Dr. W. C. Prime have a log cabin on the bank of the lake. It was in the twilight, after the sun had gone down, that my golden prize came fluttering by the open window of the cabin, and was soon in the poison bottle. It is a fine specimen, unbroken, but with some of the scales rubbed from its delicate wings. Mr. Grôte described this moth in CAN. ENT., Vol. X., p. 18, from a specimen taken in the Adirondacks by Mr. W. W. Hill, in July, 1877. Ten years later Mr. E. P. Van Duzee, our well-known Hemipterist, took a specimen at Lancaster, N. Y., not far from Buffalo, and recorded the capture in Entomologist, Vol. XX., page 100. I have seen no record of any other capture, though it is of course possible that the moth is included in private collections of which I know nothing. At any rate it is among our very rarest moths, and I am glad and proud to include it in our Franconia list.

ANNIE TRUMBULL SLOSSON.

OMISSION.

On page 224 of our September issue, between the fourth and fifth lines from the bottom of the page, the following lines were unintentionally omitted:

First and third antennal joints subequal in length, some of the veins coloured with brown..... .....*levigata*, Loew.

The Annual Meeting of the Entomological Society of Ontario will be held in the rooms, Victoria Hall, London, on Wednesday, October 11th, at 3 o'clock p.m., and also at 8 p.m.

Mailed October 5th.

Digitized by Google

Digitized by Google

THE LATE PROFESSOR WESTWOOD.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, NOVEMBER, 1893. No. 11.

THE LATE PROFESSOR WESTWOOD.

We are much pleased to be able to give in this issue a likeness of the very eminent entomologist, Professor Westwood, for which we are indebted to the kindness of the publishers of the *Illustrated London News*.

John Obadiah Westwood, M.A., F.L.S., etc., was born at Sheffield, England, on the 22nd of December, 1805, and died shortly after completing his 87th year, on the 2nd of January last. His father was a die-sinker at Sheffield, but afterwards removed to Lichfield. When nearly 16 years of age, he went to London to be articled to a solicitor, and though he devoted his attention more to the study of natural history than of law, he was admitted as a solicitor and became partner in a firm. Having some private means, which he augmented by writing and drawing, he was enabled to neglect his profession and give himself up almost entirely to entomology and archæology.

To quote Mr. McLachlan's obituary notice in *The Entomologists' Monthly Magazine*, "it was probably by his rare, artistic talent that he acquired much of his justly great reputation. His drawings of insects were masterpieces of accuracy without the slightest attempt at effect, and rapidly executed; few have equalled him in correct delineation. There certainly never has been an entomologist who left behind him so much evidence, in practical work, of his ability to delineate insects, even to the most minute dissections. But Westwood was much more than an artist in entomology. There probably never has existed, and, in the present state of the science, there never can again exist, one who had so much general knowledge, both from personal investigation and a study of the works of others; one who was less of a specialist in the modern acceptation of the term. It is true he was a specialist, but it was in the way of taking up small groups in all orders, and working them out thoroughly, his artistic talent giving merit and force to those small monographs. Under a somewhat brusque manner was concealed a hearty sympathy for all real workers, and, if he offended, it was commonly in the way of pointing out to would-be introducers, etc., of supposed novelties that some one or other had already made similar observations, his vast mem-

Digitized by Google

ory rendering him very dangerous in this respect. In society there could be no more genial companion, full of anecdote, but with small appreciation of humour. At home there could be no more generous host."

Professor Westwood was best known on this side of the Atlantic from his admirable work—"An Introduction to the Modern Classification of Insects," which was published in two volumes in 1839 and 1840. Every entomologist, worthy of the name, has no doubt made a study of this book, which still continues to be the best text-book on the subject in the English language. His sumptuous works on exotic insects, such as his "Arcana Entomologica," "Oriental Entomology," and his edition of Drury's "Exotic Insects," are also widely known, but his numerous contributions to various Natural History periodicals, a mere list of which would fill a volume, are not so familiar to our students. He was a most industrious and prolific writer, and made investigations in almost every family of insects in all the orders. His work is always characterized by its marvellous accuracy and patient elaboration of details both of structure and habit. Very rarely was he ever known to make a mistake.

He was actively associated with the Entomological Society of London from its foundation in 1833, and was for many years its Secretary. Subsequently he was elected President at three periods of two years each, and was made Honorary Life President when the Society celebrated its jubilee in 1883. He was a Fellow of the Linnæan Society from 1827, and an Honorary or Corresponding Member of Scientific Societies all over the world.

In 1858 the Rev. F. W. Hope, a wealthy amateur, who had been for years a warm friend and patron of Westwood, and had purchased his collections, gave them and his own to the University of Oxford, and founded a Professorship of Invertebrate Zoology, which bears his name. Westwood was appointed the first Hope Professor, and, in consequence, removed to Oxford, where he was a conspicuous figure in the University for five and thirty years.

Besides his Entomological work, he was a distinguished Archæologist and was widely known amongst those of kindred tastes by his investigations of the "Palæographia Sacra Pictoria," his "Lapidarium Walliæ," and "Fac Similes of the Miniatures and Ornaments of Anglo-Saxon and Irish Manuscripts." He formed a remarkable collection of carved ivories and inscribed stones, as well as of insects. In all respects he was a remarkable man, and accomplished, by dint of steady industry and enthusiastic perseverance during a long life, an amount of valuable scientific work that has rarely, if ever, been excelled.

Digitized by Google

THE FIFTH ANNUAL MEETING OF THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

ABSTRACTED FROM THE OFFICIAL MINUTES BY L. O. HOWARD, FOR THE CANADIAN ENTOMOLOGIST.

The fifth annual meeting of the Association of Economic Entomologists was held at Madison, Wisconsin, in the Science Hall of the University of Wisconsin, on August 14, 15 and 16, 1893.

Sixteen members were present, as follows :—President S. A. Forbes, Second Vice-President J. B. Smith, Secretary H. Garman, J. M. Aldrich, G. F. Atkinson, G. C. Davis, C. P. Gillette, A. D. Hopkins, L. O. Howard, M. E. Murtfeldt, H. Osborn, C. V. Riley, P. H. Rolfs, H E. Summers, F. M. Webster and H. E. Weed. A number of visitors and members of other scientific associations were present during the sessions, making rather a large attendance.

The following papers were presented, among them several from foreign entomologists, and the discussions were of the greatest interest. I shall briefly mention the papers in the order of their presentation :—

The annual address of President S. A. Forbes reviewed the 115 economic articles containing new matter published by members of the Association since the last meeting. These articles he grouped by subjects and by nature of outcome, thus giving an admirable idea of the work of the year in shape for the drawing of conclusions. He called attention to a narrowness of view and consequent inadequacy in the treatment of general questions, due to the want of comprehensive organization and systematic co-operation. In his opinion the methods of publication and enforcement of results now in general use fall far short of their final end. As a result the farmer has not responded to the suggestions of the investigating entomologist as might be anticipated. He suggested that more attention might be paid to describing the effects of the insect work than to the insects themselves, subordinating the account of the insects. He insisted that instead of making an entomologist of the farmer we should make a farmer of the entomologist. He suggested distinguishing between the temporary and permanent presentation of facts in economic publications, advising the preparation of special economic summaries or monographs of all insect injuries to each of the various crops, and printing and distributing these summaries in great numbers. Co-operation in this particular line was urged. Addresses to Farmers' Institutes should be accompanied by a printed résumé to be distributed among those present.

Digitized by Google

He spoke of the fact that the boundaries of the States represented by official entomologists are artificial, and that in consequence matters of distribution and other broad questions are seldom touched. This fact and the danger of unnecessary duplication of work, and other reasons, called for organziation, and this organization should be of flexible form, leaving each individual free to meet the special requirements of his individual work, and at the same time helping to concentrate the surplus effort which should be contributed to the accomplishment of common ends. He suggested that a committee on co-operation propose a list of subjects in which co-operative effort is desirable. These subjects should then be attacked by volunteers, who should report to the committee. In this way he thought that the benefits of organization might be obtained without the surrender of individual initiative.

The address was discussed by Messrs. Osborn, Smith and Webster. Messrs. Osborn, Smith and Garman were appointed a committee of three to consider the recommendations contained in the address.

Messrs. Edward H. Thompson, of Tasmania, R. Allan Wight, of New Zealand, and G. C. Davis, of Agricultural College, Michigan, were elected to membership.

Mr. Osborn presented a paper entitled "Methods of Treating Insects affecting Grasses and Forage Plants." In this paper he considered the insects affecting these crops by groups arranged according to the method of treatment, discussing particularly climatic conditions, natural enemies, agricultural methods and the direct method. He presented a most interesting table of insects, showing in horizontal columns the food-plants, number of annual broods, and the condition in which the species is to be found during any month in the year. The paper was discussed by Mr. Hopkins.

The next paper, by Mr. Howard, was entitled "Notes on Methods of studying Life-histories of Injurious Insects," in which he described the vivarium methods in use in the Division of Entomology of the U. S. Department of Agriculture, but insisted that outdoor work is preferable where feasible. The question of methods of ventilation of the insectary and kindred topics were discussed by Messrs. Forbes, Garman and Howard. Mr. Forbes thought that indoor work on life-histories should always be verified by outdoor observation.

Under the caption "Another Mosquito Experiment," Mr. Howard detailed his experience with the use of kerosene on the surface of mosquito

Digitized by Google

breeding pools since his announcement of his first experiment a year ago. Mr. Smith in discussion mentioned two cases where this remedy had been applied effectually on Long Island. Mr. Webster thought that further experimentation was needed on the line as to the office of mosquito larvæ in destroying organic matter in water, which might otherwise become offensive.

The Secretary read a paper by Dr. Ritsema Bos, on "*Phytomyza affinis*, Fall., as a Cause of Decay in Clematis." The larvæ of this little fly he had found to produce a disease spot on the stem a little above the level of the ground, causing the subsequent drying up of the stem. He found two generations of the fly each year, and advised the cutting off and burning of decaying stalks in early summer. Messrs. Hopkins and Garman reported similar appearances in potato stalks and the terminal twigs of apple, which were probably due to a closely allied insect.

Mr. Smith read a paper on "Farm Practice and Fertilizers as Insecticides." The nature of the paper is well indicated by its title. A number of instances were pointed out where variation in farm practice produces excellent insecticide results, and others in which commercial or artificial fertilizers destroy subterranean insects as well as invigorate the crop. The intelligent use of fertilizers combined with other intelligent farm practice, in his opinion will in the future prove the main reliance of the farmer. He showed, however, that the phosphates form a group of fertilizers which have no insecticide value.

Messrs. Garman and Webster discussed this paper, and agreed that the main beneficial results in the use of artificial fertilizers are due to the increased vigour of the plant, enabling it to better resist the attacks of insects. They doubted the primary insecticide effect of these compounds.

The above papers were all read at the first session of the Association, on the afternoon of August 14. At the second session, on the morning of the 15th, letters were read from certain foreign entomologists regretting their inability to attend the meeting.

Mr. Garman presented a paper on the "Preservation of Larvæ for Study." He drops the larva into water heated to the boiling point, leaving it for 15 seconds. Then, when the body wall is somewhat rigid, he takes it up with the forceps, and with a fine sharp scissors cuts a slit along the underside of the body, dropping it into the water again for a few seconds longer. It is then transferred to 50% alcohol, and in 12 hours to 70%, and in 12 hours afterwards to 95%, for permanent preservation.

Digitized by Google

Shape, colours and structure are well preserved in this way. As a substitute for alcohol he recommends :—boiling water, 250 cc., ; common salt, 3 teaspoonfuls ; powdered alum, one teaspoonful ; pure carbolic acid, 5 drops ; filter.

Mr. Forbes spoke of the preservation of fruits at the World's Fair, and suggested that plants injured by insects may be preserved in the same way. Mr. Summers had found nothing which would satisfactorily preserve fruits. Mr. Osborn thought that aqueous preparations would freeze. Mr. Smith has employed with success methods similar to those of Mr. Garman.

A paper by Mr. Cockerell, entitled "The Distribution of Coccidæ," was read by the Secretary. He compared the Coccidæ of the West India Islands with the adjoining mainland, and spoke of the further distribution of a number of species which he had studied in Jamaica. Of 18 species found on that Island all but 3 are known elsewhere, and 11 have been detected outside of neotropical regions.

Mr. Hopkins presented his views on "Note and Record-keeping for the Economic Entomologist." He described the system which he has worked out and adopted, and which he has proved to be well adapted to the requirements of his work. The system consists of an accession catalogue and a species catalogue. Specimens of his cards or note pads were exhibited, and Messrs. Smith, Osborn and Webster discussed the paper, Mr. Webster giving in full his own system of note-keeping. Messrs. Smith and Osborn objected to the use of check-list numbers alone for species as adopted by Mr. Hopkins.

Mr. Garman's paper on "Illustrations for the Economic Entomologist" was next presented. He considers that the object of illustrations is to convey information and to save time in description, finish and technique, being, therefore, matters of secondary importance. The different methods of reproducing drawings was very carefully and fully discussed. Etching was considered in general impracticable, as calling for a special method of drawing. Lithography was considered too expensive, and wood engraving is subject to liability of the engraver to misinterpret certain details of the drawing ; but at the same time it was admitted that of our published figures wood-cuts are the best. In spite of its disadvantages, it is the most satisfactory method, although somewhat expensive. Cheap process figures are excellent for newspaper and other transient literature. Their right in permanent literature, and especially in scientific

Digitized by Google

writings, is questionable at the present time. No cheap process known to the writer gives good results in shaded figures. These figures give promise of something better in the near future. If it were not, however, for this hopeful outlook, it would be well to return to wood-engraving. Entomologists were urged to make their drawings with extreme care and to adapt them to a particular process, and not to rest satisfied with inferior reproduction. The paper was discussed by Messrs. Osborn, Weed, Smith, Hopkins, Gillette, Forbes and Howard.

Mr. Gillette read a paper on "The Arsenites and Arsenical Mixtures as Insecticides." The article comprised a general summary, historical and critical, of the use of these substances in their different combinations. The paper was discussed briefly by Messrs. Beal, Wood and Galloway, all of whom were present at the meeting, although not members of the Association.

Upon invitation, Mr. B. T. Galloway, Chief of the Division of Vegetable Pathology of the U. S. Department of Agriculture, gave a short account of some recent work done in his division upon a bacterial disease of melons and other cucurbits, which had been found to be largely disseminated by the agency of insects, particularly of *Diabrotica vittata* and *D. 12-punctata*. Messrs. Webster, Smith and Garman had seen the same disease in their respective localities.

At the third session, held in the afternoon of August 15, an amendment to the constitution was adopted levying annual dues of fifty cents upon each member of the Association, and a resolution was passed authorizing the publication of the whole proceedings in *Insect Life*, and the sending of an abstract to the CANADIAN ENTOMOLOGIST.

Messrs. Osborn, Webster and Weed were appointed a committee on nomination of officers.

Mr. Hopkins read a paper on "Destructive Scolytidæ and Their Imported Enemy." He gave a summary of the damage done by bark-boring bettles in West Virginia and other portions of the country, and his investigation of this damage in the former State. He further described his trip to Germany during 1892, and the collection of about 1,000 specimens of *Clerus formicarius*, which he brought alive to this country. He described the placing of the insects and their over-wintering. Up to the time of presentation of the paper no means of ascertaining to what extent the insects have multiplied had been found.

Digitized by Google

Mr. Riley presented a communication entitled "Parasitic and Predaceous Insects in Applied Entomology." He indicated the utility and importance of the subject, and pointed out the dangers and disadvantages resulting from false and exaggerated opinions. He gave an extended summary of the methods in which insect enemies of insects may be utilized; and followed with a chronological and detailed account of the suggestions and attempts, successful and otherwise, to introduce parasites and predaceous insects into one portion of a country from another, or into one country from another. He showed that the general laws governing the interactions of organisms, however, are such that we can in only very exceptional cases derive benefit by interference with them. The indigenous enemies of an indigenous insect are better qualified to keep it in check than an imported species. Where the injurious insect is a foreigner, however, and has been brought over without the enemy which keeps it in check in its native home, then the introduction of these enemies will be advisable. Thus the introduction of the European parasites of the Gypsy Moth would be advisable. Such an introduction could do no possible harm, and may be productive of lasting good.

Mr. Smith followed with a paper in the same line, called "The Economic Value of Parasites and Predaceous Insects." The writer, while realizing the importance of parasites in maintaining the balance of nature, felt that their economic value has been grossly over-estimated. He showed that parasites simply reduce excess, but only after damage to crops has been done. The practical utilization of parasites is more or less a myth, except in very exceptional cases like that of Vedalia and Icerya. An injurious insect which under natural conditions is abundant each year, must be dealt with without regard to parasites or natural enemies.

Mr. Webster read a paper on "Insect Foes of American Cereal Grains, with Measures for Their Prevention or Destruction." In the main the author insisted upon the importance of proper farm practice. He knows of no better insecticide than good farming. Four-fifths of the injury done by the Hessian Fly may be prevented by a better system of agriculture. The same point was elaborated with regard to other grain insects, and the serious ravages of a number of the most important pests were pointed out, and general consideration of the proposed direct remedies was entered into. In the opinion of Mr. Webster, the field of the economic entomologist is poorly defined at present,

Digitized by Google

and too much is expected from him. The science of applied agriculture should relieve him of some of his duties. This paper was discussed in some of its details by Messrs. Riley, Forbes and Howard.

The fourth session was held on the morning of August 16. The Committee on the President's Address reported in favor of the adoption of his recommendations and the appointment of a standing committee to present a detailed plan for co-operative work among members, and to make recommendations concerning legislation. The report was adopted, and Messrs. Osborn, Smith and Garman were appointed as a committee.

Mr. Forbes read a paper by H. Du Buysson upon "Fumigation with Carbon Bisulphide for the complete and rapid destruction of Insects which attack Herbaria, Furrieries and Woollen Stuffs." In this article a very ingenious and interesting water joint for the box used for fumigating purposes was described, and the best method of employing the box for the different classes of objects mentioned in the title was given. Mr. Atkinson stated in discussion that he had used a very similar box in fumigating objects infested by insects. Mr. Garman stated that at Cambridge a zinc-lined case was constantly used for disinfecting bird and mammal skins. Mr. Riley had used the bisulphide in the insect collections of the National Museum. Mr. Smith had used it against ants and Mr. Garman against the melon louse. The latter gentleman rolls the melon vines up into a heap, inverts a tub over them, and places a little bisulphide in a saucer under the edge of the tub.

Mr. Atkinson read a paper by Dr. J. Ritsema Bos, on "Aphelenchus olesistus, nov. sp., a nematoid worm, causing Leaf-sickness in Begonia and Asplenium." He referred to a note by Mr. Atkinson, read at the preceding meeting of the Association, in which an Anguillulid is described as affecting leaves of Chrysanthemum and Coleus, making no swelling or deformity, but causing brown patches on the leaves. The author having studied and described *Aphelenchus olesistus* in Europe, where it causes almost precisely the same trouble with Begonia and Asplenium, he is inclined to think that the species previously mentioned by Mr. Atkinson is identical. In the discussion, Mr. Atkinson stated that while there were characters in the form studied by him which seemed to place it in the genus Tylenchus, he thought that careful comparison of types might show the two to be identical.

Mr. Osborn presented a paper on "Methods of Attacking Parasites of Domestic Animals." The preventive measures consisted in the ex-

Digitized by Google

amination of the introduced animals and the application of the usual direct methods. A critical summary of all the proposed remedies followed. The paper was briefly discussed by Messrs. Gillette, Aldrich, Riley, Hopkins, Weed and Howard. Mr. Riley, in speaking of the alleged poor success on the part of certain individuals in the use of kerosene emulsion, said that the difficulties of making a good emulsion and of getting intelligent farmers to use it safely are unnecessarily magnified. He further stated that he could not accept the opinion that in the case of two given remedies the poorer one was to be recommended, because the better one required a little more care and intelligence in making and using.

In the paper by Mr. Weed on "Remedies for Insects Injurious to Cotton," the author discussed the application of Paris green against the Cotton Worm by means of bags at the extremities of a long pole, carrried by a "darkey" on a mule, going at a brisk trot between the rows. This he considered to be the most simple apparatus which he had seen for distributing dry poisons. For the Boll Worm, he considered the best application to be the planting of a row of corn about every tenth row through the cotton field at such a time that it will mature early in September.

In Miss Murtfeldt's paper on "The Cheese or Meat Skipper," which followed, the author drew an interesting parallel between the tendency of the farmer to exaggerate his losses from insect damage and that of the commercial man to underestimate this damage and to conceal it because of its possible influence upon his trade. She reviewed the literature of *Piophila casei*, and said that accounts of its life-history are not readily accessible in this country. She gave a popular synopsis of her personal observations upon the species, particularly as injuring hams. The larvæ feed principally around the bony ends among the tendons, and in the fat and in the oil-saturated folds of the canvas wrappers. Hibernation is in the adult stage. About thirty eggs are laid by each female. The larval stage lasts from seven to eight days, and the puparium state about ten days. There is no definite succession of broods, and the insect may be found in all stages from May until November. The flies are readily killed by the fumes of burning sulphur or pyrethrum powder. The covering of windows with a light domestic is advised, as the flies will get through ordinary wire screens. The paper was briefly discussed by Messrs. Aldrich and Riley.

Digitized by Google

Mr. Coquillett's paper, entitled "Hydrocyanic Acid Gas as an Insecticide," was read by the Secretary. The paper consisted of an historical review of the use of this gas in California, together with an account of the methods in use at the present time, and some slight consideration of its effect upon different insects. The cost of fumigating a tree varies from five cents to one dollar, and even at the latter rate figures were produced to show that it is economical.

A paper by Dr. J. A. Lintner, on "Arsenical Spraying of Fruit Trees while in Blossom," was read by Mr. Smith. The author reviewed the experiments by Mr. Webster, and the statements by Mr. Cook, and suggested that the whole question can be settled by confining a hive of healthy bees to blossoms sprayed with Paris green, and afterward testing the stomach for arsenic. The law against spraying while trees are in blossom, as passed by the Legislature of Ontario, was reviewed, and a long list of the insects which might be satisfactorily treated by arsenical spraying at the time of blossoming was given. Further experimentation was strenuously urged. Some discussion followed by Messrs. Webster and Garman.

The fifth session was held in the afternoon of the 16th August. The following officers for the ensuing year were elected :—

President, L. O. Howard.
First Vice-President, J. B. Smith.
Second Vice-President, F. L. Harvey.
Secretary, C. P. Gillette.

Three papers on the insects of the season in their respective localities were read by Messrs. Webster, Smith and Osborn, and were discussed by Mr. Riley.

A paper by Mr. R. Allan Wight, of Auckland, New Zealand, was read by Mr. Osborn; it was entitled "*Icerya purchasi* and *Vedalia cardinalis* in New Zealand." The paper consisted of a condensed summary of the history of these two insects in New Zealand and their inter-relations. This paper was discussed by Mr. Riley.

Mr. Smith then read a paper by Mr. F. W. Urich, of Port of Spain, Trinidad, consisting of "Notes on Some Insect Pests of Trinidad, B. W. I." The paper was an interesting summary of Mr. Urich's observations on the injurious insects of that Island, and referred mainly to Coccidæ and their natural enemies, a leaf-cutting ant (*Atta sexdens*), a longicorn beetle (*Steirastoma depressum*) and certain Acridiidæ. Especial mention of a little Cyprinodont fish was made. This fish is found commonly all through Trinidad, and feeds upon mosquito larvæ. Mr. Urich suggested its introduction into America for use in tanks and ponds.

The Secretary then read a "Note on Slip-records," by Mr. Cockerell. The author suggested the use of a uniform system of notes upon slips of a uniform size by all entomologists, and submitted samples. The question was discussed by Messrs. Hopkins, Summers and Riley.

The Association then adjourned subject to the call of the Executive Committee.

Digitized by Google

LIST OF COLEOPTERA TAKEN AT SPARROW LAKE, ONT.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Sparrow Lake is an expansion of the Severn river, situate a little south of lat. 45° and east of 80° longitude. Geologically, this part of Ontario belongs to the Laurentian formation, and that of a very rugged type. The southwest side of the lake, where these coleoptera were taken, save in a few spots among the rocks, is wholly uncultivated and uncultivable to the Georgian Bay, a distance of from 20 to 30 miles. Till recently it sustained an immense forest growth, mostly pine, which has now disappeared, and has been succeeded by a dense and almost impenetrable jungle of briars and bushes of many deciduous species.

So far as coleoptera are concerned, a large majority of the species inhabiting this district must be considered autocthonous, and it is not difficult to determine approximatively such as are following the little spots of cultivation that are being interjected. The collecting was done from July 20th to August 15th. That the list is no longer is not altogether the fault of the collector; in fact, in addition to the paucity of species, while some are in great abundance, the majority are each represented by from one to three examples only.

As this part of Ontario is in a comparatively primitive condition, and no record of the coleoptera inhabiting it has been observed, the subjoined list may be of some interest:—

Cicindela repanda, *Dej.*
var. 12-guttata, *Dej.*
Cychrus Lecontei, *Dej.*
Carabus sylvosus, *Say.*
Calosoma scrutator, *Fab.*
Wilcoxi, *Lec.*
calidum, *Fab.*
Elaphrus ruscarius, *Say.*
Loricera cærulescens, *Linn.*
Nebria pallipes, *Say.*
Scarites subterraneus, *Fab.*
Dyschirius nigripes, *Lec.*
Bembidium patruele, *Dej.*
versicolor, *Lec.*
Sp. undetermined.
Pterostichus corvinus, *Dej.*
erythropus, *Dej.*
Amara exarata, *Dej.*
pallipes, *Kirby.*
rubrica, *Hald.*
Calathus gregarius, *Say.*
Platynus sinuatus, *Dej.*
extensicollis, *Say.*
atratus, *Lec.*
melanarius, *Dej.*
corvus, *Lec.*
placidus, *Say.*
Bogemanni. *Gyll.*
ruficornis, *Lec.*
Galerita janus, *Fab.*

Digitized by Google

Tachys nanus, *Gyll.*
flavicauda, *Say.*
Patrobus longicornis, *Say.*
Pterostichus honestus, *Say.*
coracinus, *Newm.*
stygicus, *Say.*
lucublandus, *Say.*
caudicalis, *Say.*
luctuosus, *Dej.*
Agonoderus pallipes, *Fab.*
Harpalus erraticus, *Say.*
viridiæneus, *Beauv.*
Sp. undetermined.
pennsylvanicus, *De G.*
fallax, *Lec.*
pleuriticus, *Kirby.*
viduus, *Lec.*
Stenolophus plebeius, *Dej.*
conjunctus, *Say.*
Anisodactylus Harrisii, *Lec.*
interstitialis, *Say.*
Ilybius biguttalus, *Germ.*
Hydaticus stagnalis, *Fab.*
Dytiscus fasciventris, *Say.*
Gyrinus canadensis, *Reg.* ?
analis, *Say.*
Berosus striatus, *Say.*
Philydrus perplexus, *Lec.*
Hydrobius fuscipes, *Linn.*
Creniphilus sub-cupreus, *Say.*
Cercyon pygmæum, *Ill.*
Necrophorus vespilloides, *Hbst.*
Silpha Americana, *Linn.*
Pæderus littorarius, *Grav.*
Sunius longiusculus, *Mann.*
Tachinus repandus, *Horn.*
fimbriatus, *Grav.*
Erchomus ventriculus, *Say.*
Lebia viridis, *Say.*
Metabletus americanus, *Dej.*
Cymindis pilosa, *Say.*
Brachynus cyanipennis, *Say.*
Chlænius sericeus, *Forst.*
pennsylvanicus, *Say.*
Anomoglossus emarginatus, *Say.*
Brachylobus lithophilus, *Say.*
Liodes discolor, *Mels.*
Homalota trimaculata, *Er.*
Bolitochara picta, *Fauv.*
Aleochara bimaculata, *Grav.*
graciliformis, *Fauv.*
Gyrophæna vinula, *Er.*
Quedius fulgidus, *Fab.*
lævigatus, *Gyll.*
Listotrophus cingulatus, *Grav.*
Creophilus maxillosus, *Linn.*
Staphylinus violaceus, *Grav.*
Philonthus politus, *Linn.*
longicornis, *Steph.*
micans, *Grav.*
cyanipennis, *Fab.*
sordidus, *Grav.*
Sp. undetermined.
Xantholinus obsidianus, *Mels.*
emmesus, *Grav.*
obscurus, *Er.*
N. S. (found here).
Baptolinus longiceps, *Fauv.*
Stenus—3 sp.
Lathrobium punctulatum, *Lec.*
bicolor, *Lec.*
Stilicus, sp.
Histerdepurator, *Say.*
sedecimstriatus, *Say.*
carolinus, *Payk.*
Lecontei, *Mars.*

Digitized by Google

Conosoma pubescens, *Payk.*
Boletobius cincticollis, *Say.*
Olisthærus substriatus, *Gyll.*
Oxyporus femoralis, *Grav.*
rufipennis, *Lec.*
Oxytelus sculptus, *Grav.*
pennsylvanicus, *Er.*
insignitus, *Grav.*
Trogophlœus 4-punctatus, *Say.*
Scaphisoma convexum, *Say.*
Hippodamia 13-punctata, *Linn.*
Coccinella trifasciata, *Linn.*
Chilocorus bivulnerus, *Muls.*
Psyllobora 20-maculata, *Say.*
Hyperaspis signata, *Oliv.*
Scymnus lacustris, *Lec.*
Endomychus biguttatus, *Say.*
Tritoma thoracica, *Say.*
Silvanus bidentatus, *Fab.*
Læmophlæus fasciatus, *Mels.*
Calopteron terminale, *Say.*
Calochromus perfaceta, *Say.*
Ellychnia corusca, *Linn.*
Telephorus lineola, *Fab.*
scitulus, *Say.*
Collops tricolor, *Say.*
Trichodes Nuttalli, *Kirby.*
Hydnocera pallipennis, *Say.*
longicollis, *Zieg.*
Cis fuscipes, *Mellie.*
Canthon lævis, *Drury.*
Onthophagus Hecate, *Panz.*
Dialytes striatulus, *Say.*
Ulkei, *Horn.*
Aphodius fossor, *Linn.*
fimetarius, *Linn.*
ruricola, *Mels.*
leopardus, *Horn.*
Epuræa Erichsonii, *Reit.*
Sp.
Ips fasciatus, *Oliv.*
Stephostethus liratus, *Lec.*
Corticaria pusilla, *Mann.*
pumila. *Lec.*
Tenebrioides corticalis. *Mels.*
Cyphon obscurus, *Guer.*
Deltometopus amœnicornis, *Say.*
Dromaeolus Harringtoni, *Horn.*
Alaus myops, *Fab.*
Agriotes fucosus, *Lec.*
Sp.
Melanotus castanipes, *Payk.*
fissilis, *Say.*
Corymbites medianus, *Germ.*
propola, *Lec.*
Dicerca tuberculata, *Chev.*
Sp. undetermined.
Buprestis rusticorum, *Kirby.*
fasciata, *Fab.*
Agrilus ruficollis, *Fab.*
Valgus canaliculatus, *Fab.*
Hylotrupes bajulus, *Linn.*
ligneus, *Fab.*
Calloides nobilis, *Say.*
Arhopalus fulminans, *Fab.*
Xylotrechus sagittatus, *Germ.*
Clytanthus ruricola, *Oliv.*
Euderces picipes, *Fab.*
Desmocerus palliatus, *Forst.*
Centrodera decolorata, *Harr.*
Gaurotes cyanipennis, *Say.*
Typocerus sparsus, *Lec.*
velutinus, *Oliv.*
Leptura nitens, *Forst.*
canadensis, *Oliv.*
vagans (var. brevis, *Kirby*)

Digitized by Google

Aphodius lentus, *Horn.*
Geotrupes splendidus, *Fab.*
Anomala lucicola, *Fab.*
Ligyrus relictus, *Say.*
Euphoria fulgida, *Fab.*
Osmoderma scabra, *Beauv.*
Trichius affinis, *Gory.*
Pachybrachys femoratus, *Oliv.*
" hepaticus, *Mels.*
Monachus saponatus, *Fab.*
Diachus auratus, *Fab.*
Adoxus obscurus (var. vitis, *Fab.*)
Xanthonia 10-notata, *Say.*
Typophorus canellus (var. aterrimus.)
Chrysochus auratus, *Fab.*
Rhabdopterus picipes, *Oliv.*
Doryphora 10 lineata, *Say.*
Chrysomela bigsbyana, *Kirby.*
Galerucella nymphææ, *Linn.*
Diabrotica 12-punctata, *Fab.*
" vittata, *Fab.*
Phyllobrotica decorata, *Say.*
Cerotoma 3-furcata, *Forst.*
Dysonycha pennsylvanica, *Illig.*
Haltica ignita, *Illig.*
Crepidodera helxines, *Linn.*
Epitrix cucumeris, *Harris.*
Systena hudsonias, *Forst.*
" marginalis, *Illig.*
Nyctobates pennsylvanica, *De G.*
Xylopinus saperdioides, *Oliv.*
Monohammus confusor, *Kirby.*
Urographis fasciatus, *De G.*
Saperda vestita, *Say.*
" 3-dentata, *Oliv.*
Amphionycha flammata, *Newm.*
Donacia palmata, *Oliv.*
" piscatrix, *Lac.*
" proxima, *Kirby.*
" 2 sp. not determined.
* Tenebrio molitor, *Linn.*
Blapstinus interruptus, *Say.*
Uloma impressa, *Mels.*
Diaperis hydni, *Fab.*
Boletotherus bifurcus, *Fab.*
Cistela sericea, *Say.*
Penthe pimelia, *Fab.*
Eustrophus confinis, *Lec.*
Canifa pallipes, *Mels.*
Stenotrachelus arctatus, *Say.*
Anaspis rufa, *Say.*
Mordella melæna, *Germ.*
" marginata, *Mels.*
Xylophilus tuberculifer, (*infra.*)
Epicauta pennsylvanica, *De G.*
Attelabus bipustulatus, *Fab.*
Ithycerus noveboracensis, *Forst.*
Lissorhoptrus simplex, *Say.*
Magdalis armicollis, *Say.*
Orchestes niger, *Horn.*
Gymnetron tetrum, *Fab.*
Balaninus uniformis, *Lec.*
Eupsalis minuta, *Drury.*
Dryocœtes, n. sp.

Loricera cærulescens, *Linn.* (*pilicornis*, Fab). A few examples of this interesting beetle were taken on the margin of the lake under pieces of drift partly immersed in the water. It seemingly avoids muddy places.

Chlænius pennsylvanicus, *Say.* A variety, or rather individuals of this species, occurred with the margins of the elytra bordered with rufous like

Digitized by Google

in *circumcinctus*, but which lack the smooth facets of the thorax of that species. This is the *circumcinctus* seen in some Canadian lists, but the true *circumcinctus* does not inhabit Canada.

Aleochara graciliformis, *Fauv.* This species, though named many years ago by Mr. A. Fauvel (as I am informed), has never found a place in our catalogue. It has been in my collection from various places in Ontario for several years. It is a very pretty species, black, thorax without impression, legs and elytra bright rufous; an occasional individual has the sides of the elytra narrowly black, and while such are more finely punctate and have darker legs they are not considered distinct.

Philonthus politus, *Linn.* (*aeneus* Rossi). This species was correctly determined by both Kirby and Macklin. It is nearly cosmopolite. The *politus* of our catalogue must be changed to *fuscipennis*, Mann. These are the latest decrees of synonymists.

Creophilus maxillosus, *Linn.* Systematists now recognize but one species of *creophilus* as inhabiting North and South America, Asia, Northern Africa and Europe. It exists in about ten named varieties or variations, *villosus*, Grav., and *bicinctus*, Mann., being the American forms.

Bolitochara picta, *Fauv.* This species was as abundant as in Pennsylvania, being gregarious on mushrooms. My types of this species are from Mr. F. Blanchard, for whom it was determined by Mr. A. Fauvel. It has the habit of a Gyrophæna. The antennæ, head, thorax, and last segments of the abdomen are dark; the legs, 3 to 4 segments of the abdomen, and pro and mesothorax are pale; the elytra are pale, with an ill-defined triangular space posteriorly and sometimes a spot around the scutellum dusky. There is at the middle of the base of the thorax a circular depression marked anteriorly with two comma-like impressions. Length, .10 inch.

Baptolinus? longiceps, *Fauv.* As Mr. A. Fauvel has stated that he had seen examples of *longiceps* from Canada, special search was made for that species, resulting in the taking of four examples, which, while not agreeing with Mr. Fauvel's characters of *longiceps* in every respect as given in his synopsis ("Tête alongée, non transverse, un peu plus etroite que le corselet; corps brun; élytres ponctuées"), probably do not vary beyond specific limits; the elytra are rather alutaceous than punctured; the form of the head—"long or transverse"—is opinionative; the colour of the elytra, thorax and head, piceous. One example taken here and two others at Ligonier, in the Alleghanies, are in every way identical

Digitized by Google

Mr. A. D. Hopkins, Entomologist of the West Virginia Agricultural Experiment Station, to whom one of the Canadian examples was submitted for comparison, kindly states that there is "little perceptible difference" between it and that named *longiceps* for him by Dr. Riley through the National Museum. In the seven examples seen no sexual differences are observable in the head or abdomen. I have examples of a species occurring in the White Mountains of New Hampshire, which is quite different, having a very large head, especially the ♂. It has received the name *macrocephalus*, Nord, but from which it differs by not having the 6th ventral segment of the ♂ emarginate and the thorax tripunctate (Mannerheim's description). I have two female examples from Alaska—one from Wrangel with the thorax tripunctate (*macrocephalus*) agreeing in every other essential point with the New Hampshire females; and one from Prince of Wales Island, with the thorax bipunctate, entirely pallid, and .15 inch long, but otherwise agreeing with the Wrangel example; more material, however, must be seen before their identity can be assured. Thus it appears there are at least three distinct species of *Baptolinus* inhabiting North America, whatever may be said of names. This is the species mentioned as *pilicornis* in CAN. ENT., XXIV., 293, but more material shows that the head is smaller than in that species, the description of which otherwise is fairly applicable; and it is in many ways different from the New Hampshire species. In the article referred to, read (Rev. Entomol., VIII, 117)., *B. longiceps*, Fauv., instead of as in lines 28-29. Mr. F. Blanchard mentions (*in litt*) an example with the head scarcely punctured, taken by him in North Carolina, which probably belongs here.

Dicerca, sp. Two examples, ♂ and ♀, were taken in the lake, which seem to be nondescript; in size and sculpture they resemble Chrysea, *Mels.*, to which they were about to be referred till the terminal ventral segment of the ♀ was observed to be rounded; the same segment of the ♂ is truncate and rectangularly emarginate, and the middle tibia toothed. Other examples were subsequently seen in another collection, and it is possibly confused in northern cabinets with *chrysea*, from which it seems best separated by the sexual characters of the female.

Aphodius leopardus, *Horn*. This species occurred in some abundance, as it likewise did at Parry Sound on the Georgian Bay, and at intermediate points. It was not taken with the other species about cow-yards, but on paths through the forest. Before the introduction of domestic

Digitized by Google

cattle it probably lived in the ejectamenta of deer, moose and other wild animals; only one example of *lentus* was taken, and that in the forest; *fossor* was common, and whether it was originally introduced into America from Europe is not free from doubt—it seems to inhabit the colder and mountainous regions, and in Pennsylvania is not uncommon in the Alleghanies. *Ruricola* and *fimetarius* were excessively abundant everywhere, and seem to follow cultivation. *Inquinatus* has not as yet appeared in this district.

Dialytes Ulkei, *Horn.* Two examples were taken at Sparrow Lake and another at Rosseau, about 50 miles northward. The type of the species was taken at Deer Park, Maryland, and it is not known to me whether it has ever been duplicated.

Leptura Canadensis, *Oliv.* Occurred in some abundance; it breeds in the bark of dead pine trees like *Urographus fasciatus* does in that of oak, without entering the wood. All the females seen had the base of the elytra red; there is no uniformity in the coloration of the outer joints of the antennæ of the ♀; the 3rd joint is usually black, with sometimes a pale spot at base; the 4th is commonly pale at base for half its length, sometimes the lower side is pale for its whole length and the upper black, or again there is merely a pale spot at base; the 5th is mostly half black, but sometimes with only a pale basal spot; the 6th may be altogether pale, or with the apex black, or with it spotted on one side or on both; the 7th is altogether black, but exceptionally with a pale basal spot; the 8th is altogether pale, with the apex sometimes black; the 9th is as the 7th; the 10th is usually pale at base, but sometimes altogether black. The antennæ of the ♂ are black, but in some examples there is a pale spot at the base of joints 6 and 8. These particulars have been entered into to show that antennal colour variation cannot be used to separate into species the variable forms now included in *Canadensis*.

Leptura vagans, *Oliv.* (var. *brevis*, Kirby). This variety should be placed in our catalogue, inasmuch as it exists locally of a fairly constant type; that is, with dark elytra with a sulphur-yellow discal vitta on each; this was absent in one example, which was entirely black. The *vagans* form has usually yellow elytra, some examples being marked with brown indefinitely. Without notice it requires some research to discover that *brevis* is *vagans*.

Adoxus obscurus, *Linn.* (var. *vitis*, Fab). This was beaten in great abundance mostly from willow, though that this is its only food-plant is

Digitized by Google

not affirmed. The variety *vitis* is light brown, very constant in colour, and so far the only form occurring in Canada. The variety *obscurus* is taken abundantly in places throughout the Rocky Mountains to Arizona and New Mexico; typically it is black, but many of the examples are rufous, and in some of these the rows of punctures on the elytra are black, causing a vittate appearance. This rufous form is readily distinguished from *vitis* by the greater intensity of the colour and the much coarser punctostriation of the elytra. These two forms likewise occur in Northern Asia and Europe, as well as three other named varieties.

Dysonycha pennsylvanica, *Illig.* (var. *limbicollis*, Lec.) was taken in great numbers from Polygonum hydropiper, which it had nearly defoliated.

Systena marginalis, *Illig.*, was beaten in great abundance from the dwarf oaks growing among the highest elevated rocks.

Xilophilus, n. s. About a dozen examples of this were taken at one time by bush-beating, but owing to their minuteness only two were found in the bottle, which contained many other insects. It is about half the size of *piceus*, which it resembles in colour, and in having a transverse basal impression on the thorax, though deeper; the elytra are deeply circularly impressed at base, giving rise to two tubercles well separated by the suture; the punctuation of the head and thorax is fine and dense, that of the elytra coarser; between each facet of the eye may be seen a clavate bristle, not extending beyond the facet. The first three joints of the antennæ and the tarsi are pale. The insect is piceous-black, finely cinereo-pubescent, .045 to .05 inch long, and may be called *tuberculifer*, to preserve it from the oblivion often incidental to such small things.

? Dryocœtes, *Sp.* This is probably the species cited in Packard's Forest Insects, p. 810, (5th Rep. U. S. Commission), as *Dryocœtes*, *? affaber*, found by Mr. W. Hague Harrington in the cones of Pinus resinosa. This insect by difference of antennal club and tibial form does not appear to be a true Dryocœtes; neither by colour nor elytral striation and punctuation does it conform to Mannerheim's description of *affaber*. Examples were sent to Prof. A. D. Hopkins, of the West Virginia Experiment Station, for comparison with *affaber* as determined by Mr. Eichoff, who writes, "I have compared it with my examples of *Dryocœtes*, and find it quite a different thing from any of them; in fact, it differs so widely that I would pronounce it a new species. * * In the club of the antenna and tibia it differs from the other species so much that we might say it belonged to another genus." This species breeds in the cones of Pinus strobus, which grow to the length of 6 or 7 inches: the eggs are probably deposited in the young cones early in the season, the vitality of which becomes so much impaired by the larvæ that they drop to the ground when 3 or 4 inches long. Several of these collected the last week in July contained larvæ apparently full grown. Cones opened Sept. 10th contained the perfectly chitinized and maturely coloured beetles—20 or more in each. Therefore the pupa state must have been brief.

Digitized by Google

NEW NORTH AMERICAN HOMOPTERA.—NO. VI.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

1. AMALOPOTA FITCHI, *n. sp.*

Closely allied to *A. Uhleri.* Smaller; elytra smoky, about twice banded with white; nervures carmine, ocelli apparently wanting. Length, 6 mm.

Male: Vertex shorter and broader posteriorly than in *Uhleri*, hind margin very feebly emarginate, apex of the pronotum not advanced beyond the base of the lateral keels; frontal keel, viewed from the side, broader and more strongly rounded, with a more conspicuous notch at the base of the clypeus than in *Uhleri.* Antennæ ligulate, slightly narrowed at base, the sides thickened and parallel beyond, setigerous notch deeper than in *Uhleri.* Eyes very feebly emarginate below. Pronotum, viewed from above, less acutely angled before and exhibiting a slightly thicker edge than in *Uhleri*, the expanded sides subquadrate with rounded angles. Rostrum only attaining the apex of the hind coxæ. Elytra similar in form to those of *Uhleri*, the neuration nearly the same but with fewer apical areoles, these being ten in number from the tip of the clavus to the apex of the subcostal nervure; subapical areoles six, of which the first (outer) is large and oblong, the second small and triangular, and the third the longest; basal nervures four, long.

Colour pale yellowish-white, more obscure on the mesonotum and abdomen; sides of the face with a transverse carmine band between the base of the antennæ and the eye which is extended along the sides of the thorax where it becomes darker; abdomen sanguineous above, the genital segments brown. Eyes and tip of the rostrum black; antennæ reddish-brown, the thickened edges darker. Elytra blackish-fuscous; a basal elongated yellowish spot on the costa including the rounded elytral appendage; beyond this are two rounded dots, a broad transverse median band not touching the costa, and a large angular spot on the third and fourth subapical areoles sending a branch to the apex of the costa and another to the middle of the apical margin, whitish-hyaline; narrow costal area white with four brown spots, the stigmatal deeper and crossed at apex by a heavy carmine veinlet; nervures carmine-red, heavier about the stigmatal region, around the apex alternated with white; costa and a line on the commissure near the apex of the clavus, yellowish. Wings whitish-hyaline, with slender sanguineous nervures.

Digitized by Google

New York. Described from a single example beaten by me from a tree of the wild black cherry among the hills about twenty miles south of this city, on July 28th, 1892. This delicate little creature is a very interesting addition to our list of North American Derbidæ. Though quite distinct it is closely allied to the *A. Uhleri*, described in 1889, from Western New York specimens. (See CAN. ENT., Sept., 1889). The characters of genus *Amalopota*, founded by me for the latter species, must be somewhat modified for the reception of *Fitchi*, as in this species the ocelli seem to be wanting, while in the *Uhleri* they are quite distinct, though small and but poorly defined. This genus, though certainly valid, is very near *Anotia*, and forms a connecting link between it and *Otiocerus*.

2. CICADULA SLOSSONI, *n. sp.*

Form and ornamentation of *C. variata* nearly, but much smaller, with the vertex shorter and the black markings more elaborate. Length, 2½ to 3 mm.

Vertex ¼ longer on the middle than next the eye, blunter before and more rounded in both directions than in *variata*. Whole head much more deeply and coarsely punctured, the clypeus a little more narrowed apically, and the outer margins of the cheeks under the eyes shorter and more deeply excavated, with the outer angles more prominent than in *variata*. Pronotum distinctly transversely wrinkled, omitting the broad posterior margin which is closely punctured; in *variata* the pronotum is nearly smooth and more convex. Sides of the pronotum shorter, with the lateral angles more rounded and the latero-posterior edges more oblique than in *variata*. Last ventral segment of the female long, closely appressed over the base of the pygofers, the hind margin slightly waved, not distinctly notched on the middle as in *variata*. Valve of the male shorter than in *variata*, with the apical margin but feebly arquated; the plates longer and with their attenuated points longer and less recurved than in the larger species.

Colour: Head yellow; vertex with a large oval black spot on each side including a yellow dot and sending a branch anteriorly to the eye, apex with two large transverse black spots; about four broken arcs on the base of the front, a cloud beneath the eye, all the sutures of the face and the median line black, the latter expanded on the apex of the clypeus and the disc of the front. Antennæ dusky. Pronotum tinged with yellow anteriorly and marked with black along the fore border, and a double brown longitudinal median band widening on the hind margin.

Digitized by Google

Scutellum black, with the tip, the lateral margins anteriorly, and a median line reaching only to the transverse impressed line, yellow. Elytra white, dusky toward the apex, marked as in *variata*, with oblique brown bands forming a lozenge anteriorly, including a pale commissural spot, and an x posteriorly with the tip of the clavus as its centre, the median bands being common to both marks. These brown bands do not attain the costal margin, and are more strongly distinguished than in *variata*. Abdomen and pleural pieces deep black, the margin of the tergal pieces slenderly yellow, venter sometimes yellow with the segments and connexivum bordered within their margins with blackish. Legs brown, the joints and tibial spines pale.

New York; New Hampshire. Described from three examples; one male taken by me at Lancaster, N. Y., July 12th, 1889, a female taken at "High Bridge," New York City, in June, by Mr. E. B. Southwick, and a second female taken on the summit of Mt. Washington by Mrs. Annie Trumbull Slosson, to whom I take pleasure in dedicating this pretty little species as a slight tribute to her persevering devotion to the study of entomology.

3. CHLOROTETTIX NECOPINA, *n. sp.*

Form and size of *tergatus* nearly. Vertex with a black transverse band between the eyes. Colour above greenish-testaceous, marked and clouded with brown; elytra fuscous, with strong white nervures. Length, 7 mm.

Vertex a little more produced than in *tergatus*, and the front proportionately longer and narrower; ocelli contiguous to the eyes. Last ventral segment of the female thin, broadly and deeply cleft nearly to its base; this incisure at its apex armed with a small blunt tooth, the lateral lobes ovate, in one example feebly angled at apex. Pygofers stout, very slightly exceeded by the oviduct, and armed with a few stout brown bristles. Other characters about as in *tergatus*.

Colour: Beneath pale greenish tinged with testaceous, especially on the front, which is marked on the sides by about ten nearly obsolete brown arcs, and two brown dots are at the base of the clypeus; eyes dark brown edged with pale. Vertex with a broad transverse blackish band just behind the ocelli. Pronotum testaceous, pale before and on the median line, either side of which is a brown cloud, and a smaller one occupies the latero-posterior angle, transverse wrinkles less distinct than in *tergatus*. Scutellum marked with a piceous triangular spot within the

Digitized by Google

basal angles, the median line, a dot on either side, and the impressed line brown. Tergum fuscous, testaceous on the sides, the segment, edged with pale. Elytra fuscous-brown, nervures conspicuous, white, brown at apex. Wings smoky, iridescent, nervures brown. Legs pale testaceous, claws and tip of the rostrum piceous.

Mississippi. Described from two female examples kindly sent me by Mr. Howard Evarts Weed.

This very distinct species is quite anomalous in the genus in which I have placed it by its dark colouring and conspicuous markings, thus allying it with *Limotettix parallelus*. In most of its characters, however, it is closely related to *Chlorotettix tergatus*, near which it must be placed.

4. ATHYSANUS EXTRUSUS, *n. sp.*

Form of *A. variegatus*, Kirschb., broad and short; pale greyish-yellow, vertex with a transverse blackish band, elytral nervures pale. Length, 4½ mm.

Vertex longer and more pointed than in *obsoletus*, nearly ⅓ longer on the middle than next the eye; a broad transverse band on the disc and an angular spot at apex blackish, each bisected by the longitudinal median pale line. Face pale, front black with about eight pale arcs or pale with as many blackish arcs, sutures of the face and a double longitudinal line on the middle of the clypeus black; antennæ pale, set on a black cloud. Clypeus slightly narrowed to the truncated apex, its base arquated. Cheeks feebly angled without, exterior to the outer line of the loræ longitudinally wrinkled; tip of the rostrum black. Pronotum hardly longer than the vertex, mottled with dusky and showing four or five pale longitudinal lines, more or less obsolete; hind edge strongly concave, surface transversely wrinkled, broad anterior margin smooth and calloused; sides longer than in *obsoletus*, carinated; latero-posterior margins very oblique, almost continuous with the posterior margin. Scutelum with four or five brown spots, the posterior sometimes obsolete. Elytra short and broad, hardly exceeding the tip of the abdomen, pale, the areoles more or less heavily edged with fuscous. Abdomen brown or almost black, edge fulvous, with a few fulvous clouds beneath; pleural pieces brown, pale margined; legs pale, the femora banded with brown and the tibiæ dotted at the base of the spines. Valve of the male broadly triangular, apex obtuse; plates irregularly quadrangular, widely spreading, touching only at base; outer angles produced, subacute, armed with a few long bristles; inner angles rounded; styles very long, extending for

Digitized by Google

half their length beyond the apex of the plates, ligulate in form and curved downward and outward at apex; pygofers rounded at apex, almost equalling the plates, the small anal aperature placed superiorly.

New York; Connecticut. Described from three males. One taken at Portage Falls, N. Y., May 30th, 1888. The other two specimens were taken by me in Connecticut in the spring of 1883. One of these was swept from weeds and bushes on the hills about Northford, June 26th; the other, a very deeply coloured example, I found in a grove on Prospect St. in New Haven, June 4th. The long extruded styles of the males will at once distinguish this from any other of our described species of *Athysanus*.

5. ATHYSANUS INSTABILIS, *n. sp.*

More elongated than most of our species of this genus. Black, irrorated and finely marked with pale yellow. Elytra pale, the areoles edged with fuscous. Length, 4–4½ mm.

Head obtusely pointed before; vertex about ⅓ longer on the middle than next the eye, passage to the front well rounded, base with a few impunctured areas. Ocelli large, fulvous, distant from the eyes; temples broad; front convex, the sutures arquated at the antennæ and incurved at apex; clypeus feebly narrowed towards its slightly rounded apex; cheeks rather narrow, but feebly angled, not exceeding the clypeus. Pronotum rather long, with the sides long and carinated, latero-posterior edges straight, angles prominent, obtuse, surface strongly punctured or shagreened. Elytra long, with the appendix well developed. Valve of the male short, obtuse at apex; plates forming an equilateral triangle, fulvous clouded with dusky, their edges nearly straight, fringed with pale bristles. Last ventral segment of the female slightly produced and rounded on the middle, feebly arquated either side within the short subacute lateral angles; pygofers rather small, slightly exceeded by the oviduct.

Colour black. Base of the vertex, outer edge of the cheeks, and margins of the eyes slenderly yellow. Two transverse spots on the disc of the vertex near its base, two lines anterior to these, one or two dots near each eye, an angled slender line on the apex including a dot behind, a dot on the temples, about six arcs, a basal spot and a longitudinal line on the front, the latter expanded against the base of the clypeus, and

Digitized by Google

a spot on each lora, fulvous-yellow; disc of the cheeks with a pale cloud which sends a branch along the upper edge of the lora to the front. Antennæ black, base of the seta pale. Pronotum irrorate and narrowly edged with pale, with a few irregular yellowish marks along the anterior border. Middle line of the scutellum, a curved mark either side of this on the basal field and the margins yellow, the latter interrupted at their middle. Narrow edges of the abdominal segments and the spines of the pygofers pale. Femora with a fulvous band; hind tibiæ yellow, dotted with piceous, the spines and claws whitish. Elytra soiled white, smoky at tip, nervures concolorous broadly bordered with fuscous, the costal and commissural pale.

Michigan; Colorado. Described from one male and three female examples taken at Agricultural College, Michigan, by my friend Mr. G. C. Davis, and another female received from Prof. C. P. Gillette, taken in Colorado.

This insect is nearly allied to the species described by me as *Athysanus striatulus*, Fall. (?), in Ent. Am., vi., p. 134, like which it has a well-developed elytral appendix. Two of the specimens before me have a second transverse nervure between the first and second sectors of the elytra, thus allying them to *Deltocephalus*, but for the present it seems better to place them in genus *Athysanus*.

Our described North American species of *Athysanus* may be arranged as follows:—

A. Stout species with a short vertex and abbreviated elytra, without an appendix:—

1. *A. obsoletus*, Kirch. 2. *A. extrusus*, Van D. 3. *A. comma*, Van D. 4. *A. plutonius*, Uhler.

B. Smaller, more elongated species, with more produced subconical heads and longer elytra without an appendix:—

5. *A. Curtisii*, Fitch. 6. *A. bicolor*, Van D. 7. *A. obtutus*, Van D.

C. Species similar in form to those of the last section, but with a shorter head, flatter vertex, and longer elytra with a well-developed appendix:—

8. *A. instabilis*, Van D. 9. *A. striatulus*, Fall. (?).

Digitized by Google

NOTES ON A POLYMORPHIC BUTTERFLY, SYNCHLOE LACINIA, GEYER (IN HUB. ZUTR.), WITH DESCRIPTION OF ITS PREPARATORY STAGES.

BY W. H. EDWARDS, COALBURGH, WEST VA.

"Godman and Salvin, Rhopal. I., p. 177, 1882, under the specific name *Lacinia*, place *Saundersii* and *Tellias*, Bates; *Quehtela* and *Ardema*, Reakirt; *Paupera*, Felder; *Mediatrix* and *Misera*, R. Felder; *Pretoria*, Boisduval; *Crocale*, Edwards; *Adjutrix*, Scudder, and *Adelina*, Staudinger; all of which they consider but inconstant forms of one species. From their works we quote: 'Between these extremes, *Adelina* and *Saundersii*, every gradation of colour can be traced, and all the rufous markings, as well as the yellow ones of the under side, can be exhibited in different individuals from their maximum development till they vanish altogether. . . . In the Southern States of North America, a form occurs which is very like *Saundersii*, and is prevalent in Texas. This is *Adjutrix*, Scudder, but we doubt the possibility of maintaining its distinction. In Arizona another form occurs, *Crocale*, Edw., which we take to be undistinguishable from *Adelina*, and therefore connected with the whole series.'" Quoted from E. M. Aaron, in Papilio IV., p. 177, in his paper entitled List of a Collection of Diurn. Lepid. from Southern Texas. Mr. Aaron adds: "Among these Texas captures were *Saundersii*, *Adjutrix* and *Mediatrix;* the latter two were taken in copulation."

I have not access to the works of Godman and Salvin, but Dr. Skinner informs me that they figure eleven forms of this species, and its localities extend even to Peru and Bolivia. These authors based their opinion as expressed not at all, so far as appears, from rearing the larvæ. Indeed, until recently, no one seems to have been acquainted with any of the preparatory stages, not only of *Lacinia*, but of any species of the genus *Synchloe*. In 1892, Prof. Packard sent me in a tube with alcohol an adult larva and pupa, received by him from Prof. Tyler Townsend, of Las Cruces, N. M. In 1893, by the aid of Mr. T. D. A. Cockerell, also of Las Cruces, I have been able to study all the stages from egg to pupa. He wrote 7th July: "I saw a black and white butterfly, rather like a small Limenitis (was it not Synchloe *Crocale?)* settle on two or three leaves of a sunflower." On 26th July: "Yesterday, Prof. Owen took me to his ranch, a short distance from Las Cruces, and I got there some *Crocale* larvæ, which I send herewith. I find that the young are gregarious, feeding as closely as they can stand on the upper side of a leaf of

Digitized by Google

Helianthus, which they skeletonize, instead of devouring the whole thickness, as older ones do. They remind me of the young larvæ of Vanessa *Urticæ*. The older larvæ I send are of a red variety. The larvæ are trimorphic, with forms as follows:

1. *nigra*, a black form.
2. *bicolor*, black with broad red dorsal stripe.
3. *rufa*, red form."

Again: "The Helianthus appears to be the common H. annuus. One finds several larvæ (adult) on one plant. Each has a leaf to itself, and they select the large leaves, not the young tops. They rest on the middle of the leaf, feeding by day, exposed to the sun. They must be inedible to birds, as they are very conspicuous. They gnaw holes out of the middle of the leaf. I could not see that they make any sort of web, and when alarmed they drop to the ground. At one place I found three or four, all black. One larva found on a narrow-leafed composite (not in flower) was about to pupate. It may have wandered from a sunflower, though there was none nearer than several yards. It was pupating quite exposed on the leaf."

On July 29th: "Yesterday, I found some batches of larvæ about one-half grown, still gregarious, and for the most part on the under side of the leaves. One batch was entirely of black larvæ, but another, to my surprise, contained all the variations mentioned in former letter. In the majority of cases a brood is all of one colour, but at least sometimes the three colours may all appear in one brood. I also enclose a *Crocale* butterfly which was caught and killed by a large Asilid fly (Proctacanthus Philadelphicus, Mocq.)"

Aug. 27th: "Yesterday I was in Juarey, Mexico (across the river opposite El Paso), and got a lot of insects. Among them both typical *Crocale* and the orange-shaped *Adjutrix*, as also a very pretty aberration, *rufescens*. I send all these herewith, as also what I call ab. *nigrescens*, an unusually black form of *Crocale* proper, which I bred here in Las Cruces."

There came two labelled *rufescens* and considerably unlike. One has a broad red band across both wings reaching nearly to costa of primaries, with marginal red spots on both wings; the other has the red band on hindwings one-half wider than usual and of deep colour, but there is nothing of it on forewing, nor are there marginal red spots. Both these varieties, I doubt not, have received species names. The bred *nigrescens*

Digitized by Google

has the spots that compose the white mesial band on hindwings reduced to mere streaks of white on the nervules. No doubt this has received a species name. But one of the Juarey examples is plainly *Ardema*, of Reakert: "hindwings black, with an indistinct orange-brown shade across the disk."

Mr. Cockerell wrote 9th Sept.: "On the college farm, yesterday, I found a batch of Synchloe eggs on the under side of a sunflower leaf. They are like the eggs I sent before. They are like the eggs of Melitæa, as figured by you in Butt. N. A. Synchloe seems to be practically a Melitæa in its earlier stages. I send one example of larva, black with numerous yellow-white dots, a sub-variety of the black type. I found several such."

During the season I had also received several batches of larvæ of Phyciodes *Carlota*, from Montana, and eggs of same from Colorado, and the larvæ from the *Crocale* eggs were reared at same time with the others, so that I was able to compare the two species step by step. The eggs of the two are in no way distinguishable, nor are the larvæ in the first two stages; as regards shape and armature they are alike in the succeeding stages, but differ in coloration. But the pupa of the Synchloe is not like that of *Carlota*, which is of the typical Phyciodes shape and appearance, and like *Tharos*, but is closely like the pupa of Melitæa *Baroni*, as given in Butt. N. A., Vol. III., pt. 3. The stages are described as follows:—

Egg.—Similar to Phyciodes *Tharos:* obovoid, truncated at top, rounded at bottom, the lower three-fifths, or about that, examples varying, covered with irregular shallow indentations; the upper part ribbed, about twenty-four ribs, not much elevated, not sharp, the interspaces roundly and shallowly excavated; top slightly depressed; colour when first laid pale green, later changing to green-yellow. Laid in close clusters side by side in several rows. In the cluster under view each complete row (4) contained just nine eggs, and there were shorter rows on either side of these; on the top was part of another layer, placed irregularly and more or less on their sides. These eggs were believed to have been laid 8th Sept., or on the day when found, and hatched on 15th, or after six days.

Young Larva.—Length at one day from egg, .06 inch; cylindrical, even, each segment well rounded; furnished with many tapering black hairs, or processes, of which those on segments 3 and 4 are in cross line on the middle, four on either side above the spiracular line; on 2 is a black oval chitinous patch on top of dorsum, on which are six shorter

Digitized by Google

processes in line, and another on each side just below the patch; also two others in vertical row to the front and opposite the spiracle, on segments 5 to 12 inclusive six processes, three on either side, arranged in triangle as usual in the family; on the front of 13 are six in cross line, and the triangle on either side to the rear; along base of body one similar short process over each foot, two on 5 and 6 each, and one each to the remaining segments up to 12, in addition to which is a still shorter process over base of each proleg, and on 5, 6, 11 and 12 below the other; colour green, with a brown tint; head scarcely broader than 2, obovoid, slightly bilobed, shining black-brown, with scattered short processes over the face like those of body. Duration of this stage three days.

After first moult: Length at one day, .1 inch; colour variable, some examples being light brown with a green tint, some of brown of darker shades; the spines as in Phyciodes, rather short, slender and tapering, glossy black, with short bristles about them at a small angle, and rising from shining black tubercles; head cordate, glossy black, with many curved processes on the front. Duration of this stage, three days.

After second moult: Length at one day, .14 inch; colour variable, some larvæ being wholly black, some rust yellow, some of this last have on dorsum and lower half of side, a dark brown sub-dorsal band intervening; the spines rather longer in proportion than before, otherwise similar; head as before. Duration of this stage, three to four days.

After third moult: Length at one day, .3 inch; shape and spines as before; the colour as before, but the russet more red, and on those which are wholly russet are two black cross lines to each segment, one on the rear, the other at the junctions; head as before. To next moult, about four days.

After fourth moult: Length at one day, .52 inch; variable as before, the rust colour deepened into red-fulvous. At about six days was full-grown.

MATURE LARVA.—Length, .1 to 1.2 inch. Cylindrical, even; colour very variable, some being bright red-fulvous; at the junction of the segments a stripe of glossy black, and on 4 to 10 inclusive a narrow, dull black stripe near the rear of each; under side greenish-brown, as is also the front of 2; on the middle of 2 a dorsal chitinous collar, on which are six small spines, three on either side the mid-dorsal line; a little below these another; a long spine below the spiracle; the spines on the succeeding segments arranged as in Melitæa, black, shining, not long in pro

Digitized by Google

portion to the size of the body, rising from shining black tubercles, tapering to an irregular top, and surrounded by many short black bristles set at a small angle; head cordate, black, glossy, with many tapering hairs or processes on the face. Other examples are yellow-fulvous; others have a continuous red-fulvous band on dorsum, rather wider than the tubercles of the dorsal row of spines; or this band is macular, a rectangular spot being on each segment, bearing the spine; the lower part of side is also red-fulvous, and the intervening space is dark-brown, forming a sub-dorsal band the length of the body. The red on dorsum is sometimes reduced to a small patch on each segment, on rear. Others are black throughout, except that over the upper part are specks and minute spotes of white or yellowish; others are black, but from the second lateral row of spines to basal ridge is a band of greenish-white and black, mottled, and sometimes the upper edge of this band shows a macular fulvous line. In all, the spines are black. There are at least three distinct types of larva:

1st.—All red- or yellow-fulvous.

2nd.—The dorsum and lower part of side fulvous; the subdorsal area dark-brown.

3rd.—All black, or black with a greenish band on side.

From fourth moult to pupation, about seven days.

CHRYSALIS.—Length, .45 to .52 inch ♂; .55 to .64 inch ♀. In an example of which the length was .52, the breadth both at mesonotum and abdomen was .2 inch; cylindrical, shape of Melitæa; head case short, narrow at top, and a very little incurved, the sides excavated; mesonotum rounded both ways and rising to a slight prominence on the rear, but not carinated, followed by a slight depression; abdomen conical; the wing cases somewhat elevated, bevelled down to the abdomen on the margin; colour the first day white, pink-tinted, then becoming ivory-white, specked and spotted with black, with some black bands or stripes; a stripe across the top of head case, a band from end to end on the ventral side; some spots on the head case; on mesonotum two spots in front, two on rear, one on either side (at the tubercle); in some examples these are mere points, but in others large, and form a ring around the middle of the mesonotum; on the abdomen a black crescent on the anterior side of each tubercle; on middle of wing case a bent bar, two patches at hind margin, and several dots; the tubercles correspond to the spines of the larva, and are low, conical, orange. But there is great

Digitized by Google

variation in the size of the black marks, and there is every grade to a nearly black pupa, black marked with white. No two of the melanic examples were alike. Duration of this stage, five to seven days. By the above, it will appear that the pupæ also are polymorphic, some being almost wholly white, some almost wholly black, with all sorts of intergrades.

These resulted from the pupæ reared in July and August imagos which came out between 2nd August and 19th :—

1st.—From all red larvæ.....3 orange banded, or *Adjutrix*
8 white banded, or *Crocale*

2nd.—From all black larvæ.....15 .....*Adjutrix*
3 .....*Crocale*

From pupæ of the succeeding brood of larvæ, the imagos out between 29th August and 8th September :—

1st.—All red larva.....4 .....*Crocale*

2nd.—All black larvæ.....2 .....*Crocale*
4..... *Adjutrix*

3rd.—Red backed larvæ.....13..... *Crocale*
3..... *Adjutrix*
1 with a very slight orange tint.
1 very red and broad band.

The last brood of larvæ of the year, out of eggs hatched Sept. 15th, hibernated after third moult early in October. As this is exactly the habit of the Phyciodes (as *Nycteis* and *Carlota)*, we may assume that the larvæ on their waking up early in spring, (Feb. or March, no doubt, at Las Cruces), would be in pupæ within two weeks thereafter, to give imagos a few days later. Probably, therefore, the butterflies are on the wing by April, and thereafter a brood will appear at least monthly. If this is so, the first larvæ received by me, in July, would have come from the third generation of butterflies of the year. This generation, from 29 pupæ, gave 18 *Adjutrix* imagos to 11 *Crocale*, or 62 per cent. *Adjutrix*, and 38 per cent. of *Crocale.* The following generation, from August larvæ, out of 28 pupæ gave 19 *Crocale* to 9 *Adjutrix* (including all red-banded), or 68 per cent. *Crocale* and 32 *Adjutrix.* The proportions in the two generations were nearly reversed, and as the season goes on there would seem to be a tendency to produce the white banded form. It will be of interest to watch the outcome of the hibernating larvæ, and I hope by Mr. Cockerell's aid next season to learn which form prevails in the two or three earliest generations.

As I am correcting the proof of this paper, I can add from a letter of Oct. 21st, from Mr. Cockerell ;—"The Synchlœ is still flying here in fair numbers. I find that in a state of nature the larvæ hibernate gregariously in the dead, curled up leaves of the sun-flower.

Digitized by Google

ON A SEEMINGLY MICROLEPIDOPTEROUS LEAF-MINER OF THE NARROW-LEAFED COTTONWOOD.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA, W. I.

In the same leaves of *Populus angustifolia* in which were found the tenthredinid (lepidopterous?) leaf-miners,* in the Canada Alamosa, northern Sierra county, N. Mex., in June, 1892, there were also found specimens of a very distinct leaf-miner. It bears a striking resemblance to the leaf-miner of the vine found in the Mesilla valley of the Rio Grande. It possesses the sucker-like mouth of that miner. After being mounted in glycerine on a slide for several days, however, the outer portion of the distended sucker-like organ became transparent, exposing within what appear to be two stout rounded mandibles with teeth on their inner edges.

Since this miner is footless, and yet possesses toothed mandibles, I infer that it is microlepidopterous. It mines on the lower side of the leaf, not being visible from above.

Description of miner.—Length, 3½ mm. Colour entirely white. Whole larva fleshy, consisting of thirteen segments. Widest anteriorly, narrowing posteriorly. Segments laterally rounded, the anterior ones especially projecting on sides, the body being laterally deeply incised at sutures. Head rather triangular in shape, running to a blunt point anteriorly, widest behind—where it is less than ⅔ the width of prothoracic segment. Anterior end of head terminated with a sucker-like organ distally distended, constricted at base into a neck-like junction with the head, enclosing and concealing a pair of apparently corneous jaws or mandibles. Mandibles are a little longer than wide, rounded-oblong, furnished on inner edge with three recurved or posteriorly directed teeth. Antennæ springing from anterior lateral edge of head just posterior to the neck-like constriction of the sucker-like capsule which encloses the mouth-parts. The antennæ are apparently 4-jointed, but possess some supernumerary bud-like joints. First two joints about same length, the basal one slightly thicker; third joint less than half as thick and shorter than second, accompanied by two slender bud-like or tooth-like joints which spring from the second joint and are shorter and narrower than third joint. Fourth joint a little shorter and smaller than third, about size of the supernumerary joints just described, accompanied by a shorter super-

*See article "Another leaf-miner of Populus," in Journ. N. Y. Ent. Soc., Vol. I,

Digitized by Google

numerary joint which is terminated by a bristle. Eyes situated immediately behind base of antennæ, on outer edge of head, appearing as a black dot with three other dots in a row behind. Prothoracic segment widest; mesothoracic and metathoracic segments about same width, and a little narrower; segments 5 to 7 about equal, and much narrower than thoracic segments; 8 to 11 successively and gradually narrowing, 12 a little longer than 11; 13 widened, especially posteriorly, narrowing anteriorly, incised on lateral edge. All the segments nearly the same length, the posterior ones more elongate for their width, head longer than prothoracic segment. Surface of body very thinly clothed with a few fine moderately long hairs, some on head. Feet and legs entirely absent.

Described from an alcoholic specimen in a glycerine mount. A second specimen, about the same size, has the segments more approximated, body hardly as tapering posteriorly, lateral incisures hardly as deep, and the anal segment not widened. It is, perhaps, the same species. Canada Alamosa, June 17.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The annual meeting of the Society was held in its rooms in Victoria Hall, London, on the 11th and 12th of October, the vice-president, Mr. J. M. Denton, occupying the chair in the absence of Mr. Harrington, the president, who was unfortunately unable to be present. The reports of the treasurer, librarian and curator, the council, the botanical, ornithological, geological and microscopical sections were read and approved Several interesting papers were read and addresses delivered. A number of rare and remarkable specimens were exhibited. Full reports of the proceedings will be published in the forthcoming annual report to the Legislature of Ontario.

The following gentlemen were elected officers for the ensuing year:—

President—W. Hague Harrington, Ottawa.

Vice-President—J. Dearness, London.

Secretary—W. E. Saunders, London.

Treasurer—J. A. Balkwill, London.

Directors—Division 1—James Fletcher, F. L. S., F. R. S. C., Ottawa.

" 2—Rev. C. J. S. Bethune, F. R. S. C., Port Hope.

" 3—Gamble Geddes, Toronto.

" 4—A. H. Kilman, Ridgeway.

" 5—R. W. Rennie, London.

Digitized by Google

Librarian and Curator—J. Alston Moffat, London.

Editor of the CANADIAN ENTOMOLOGIST—Rev. C. J. S. Bethune, M.A., D. C. L., Port Hope.

Editing Committee—J. Fletcher, Ottawa; H. H. Lyman, Montreal; Rev. T. W. Fyles, South Quebec; J. M. Denton and J. H. Bowman, London.

Delegate to the Royal Society—Rev. T. W. Fyles, South Quebec.

Committee on Field Days—Dr. Wolverton, Messrs. Clement, Elliott and Stevenson, London.

Auditors—J. H. Bowman and J. M. Denton, London.

HYBLŒA PUERA, CRAMER.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

Mr. Butler (P. Z. S., 1892, p. 133) remarks concerning the *Hyblæidæ* (*Hyblæinæ*, I would rather write) as follows:—

"The position of this family is somewhat doubtful; the aspect of the species forcibly reminds one of the Tortrices, but the neuration does not altogether correspond with that of the *Tortricidæ*; at the same time the *Hyblæidæ* do not appear to be true Noctuites." How this may be, I cannot venture to judge, but *H. puera* is very common in Kingston, Jamaica, and as I have bred it, a description of the larva may help to decide the question.

Larva: about 19 mm. long, rather reminding one of the *megacephala* group of *Acronycta*. Body cylindrical, with sparse hairs of moderate length Head shining pitchy-black Body black above, with a more or less interrupted red dorsal stripe; and very narrow subdorsal white stripes, much broken into spots. The black continues as far down as the spiracles, but just above the spiracles is another broken white line, like the subdorsal. There is a narrow yellowish-white band along the lower margin of the black, and below this the body is marbled with grey and pale reddish-brown, a small hair-patch below each spiracle being ringed with white. Abdominal legs pale brown. Thoracic legs shining red-brown. The first 3 and the last body-segments are almost entirely black beneath. Lives in curled-up leaves of *Catalpa*, in which it pupates.

Pupa bright red-brown.

Larva and pupa found in Kingston, May 3, 1892. Three moths emerged on May 10.

Mr. J. J. Bowrey has briefly referred to the larva in Handbook of Jamaica, 1881, p. 118. Moeschler, in his Porto Rico work, says the larva is found on *Crescentia* and *Tecoma*. The distribution of the insect is extraordinary—West Indies, Brazil, Java, Ceylon, Nepal, China, S. Africa, Madagascar, Mauritius, etc.

Digitized by Google

BOOK NOTICES.

EXPERIMENTAL FARMS: REPORTS FOR 1892. Printed by order of Parliament: Ottawa, 1893.

This valuable "Blue-book" has been before us for some time, having been distributed in April last, but various circumstances have prevented us from noticing it and several other publications, for which we are indebted to the courtesy of the authors. Our readers will, of course, be chiefly interested in the report of Mr. James Fletcher, the Entomologist and Botanist of the Central Experimental Farm at Ottawa, which occupies twenty-four pages of the volume. After mentioning the chief insect attacks of the year, Mr. Fletcher gives an interesting and valuable account of the life-histories of the Hop-vine Borer (*Hydræcia immanis*, Guén.), the Red Turnip-beetle (*Entomoscelis adonidis*, Fab.), the Western Blister-beetle (*Cantharis Nuttalli*, Say), and the Birch Bucculatrix (*B. Canadensisella*, Chamb.); in these there is much new and original matter, as well as a summary of the previous observations of others. The identification of the hop insect, which is also called, from its mode of attack, the "Collar-worm of the Hop," is particularly interesting. Its injuries have been observed for more than twenty years, but it was a long time before the moth was reared from the destructive larvæ and its identity established. The most effective remedy for this insect appears to be the encouragement of the unsavory skunk in the hop-yards; in the northern part of the State of New York and in Wisconsin, this animal has been found most useful from its habit of digging round the infested plants and devouring the worms. The turnip and blister-beetles referred to have been very destructive in the Northwest Territories, the latter attacking the Windsor Bean, while the Birch Bucculatrix has infested the trees in the neighbourhood of Ottawa. Mr. Fletcher also describes several useful parasites which serve to keep in check the currant and willow saw-flies and other injurious insects. The remainder of his report is devoted to an account of the potato-blight which affects the leaves of the plant, and the potato-rot affecting the tubers, and a chapter on lawn grasses and fodder plants.

CATALOGUE OF THE LEPIDOPTEROUS SUPER-FAMILY NOCTUIDÆ FOUND IN BOREAL AMERICA: By John B. Smith, Sc. D.: (Bulletin No. 44 of the United States National Museum). Smithsonian Institution, Washington, 1893.

This volume of four hundred and twenty-four pages will be heartily welcomed by every student of the Noctuidæ of North America. It is not a mere list of species, but a complete bibliographical and synonymical

Digitized by Google

catalogue. The authority, date and reference are given for each genus, and under each species are given the date, author and place of publication of the original description, followed by any other published references, the synonymy, habitat, and where the type can be found. Anyone who has attempted to keep a record of the published references to our Lepidoptera—and we have all been compelled to do so in some form or other—will appreciate the immense amount of labour that Prof. Smith has performed in the preparation of this work, and must feel heartily grateful that he has now relieved us of a task that few are competent to accomplish satisfactorily. The saving of time, and the satisfaction of knowing that one is not now likely to overlook anything that has been published regarding a species, are no small boons to the student. For a full explanation of the origin and purpose of the work, we must refer the reader to Prof. Smith's somewhat lengthy preface, which will be found well deserving of careful perusal. The general index at the end of the volume makes the work complete, and we have no hesitation in saying that it is the most useful publication on the North American Noctuidæ that has yet been issued from the press. We trust that the author will before long be able to lay us under still greater obligations to him by the publication of his contemplated monograph of the whole of this family of moths.

CORRESPONDENCE.

CORRECTION.

Sir,—In my last paper, "Washington Tenthredinidæ, etc." I find that I have made the following mistakes:—Page 238, line 13 from top, 23 from top, and page 239, line 6 from bottom, the word *labium* should in each case be *labrum*.

A. D. MacGillivray.

CALLIDRYAS EUBULE.

Sir,—On the 5th of October last I observed a bright yellow butterfly, much larger than any of our species of Colias, flying in the street here, but it soon passed out of sight over some houses. On the 9th inst. I observed some others, and at last succeeded in capturing what proved, to my great delight, to be a specimen of *Callidryas Eubule*, the first taken in the State of Iowa. Hitherto it has not been seen north of Missouri; though I have collected in this State for ten years, I have never met with this butterfly before, but now I have taken no less than four specimens, all females, and so fresh that they look as if they had just emerged from the chrysalis. Keota is built upon "the divide," and is ten miles either north or south from any heavy belt of timber, or any large stream of water. These specimens must therefore be "wind-visitors," as Mr. Grote terms them, and have been wafted here by the air-currents from the south.

A. S. Van Winkle, Keota, Iowa.

Mailed November 4th.

Digitized by Google

The Canadian Entomologist.

VOL. XXV. LONDON, DECEMBER, 1893. No. 12.

NOTES ON THE OCCURRENCE OF HEPIALUS THULE, STRECKER, AT MONTREAL.*

BY H. H. LYMAN, M. A., MONTREAL.

In the part of Mr. Strecker's Lepidoptera, Indigenous and Exotic, dated Feb. 22nd, 1875, is the description, and on the accompanying plate an excellent figure, of this species from a female sent to that author by the late Mr. Caulfield, and which was probably taken in the previous summer. The specimen was found in Phillips Square, which is about two miles from its nearest known locality, by the caretaker, from whom it passed to the taxidermist of the Natural History Society, who gave it to Mr. Caulfield.

From that time I can find no further record of its capture till that given in the Feb., 1884, number of the CANADIAN ENTOMOLOGIST (Vol. XVI., 39), by the late Mr. Bowles, who recorded having received a specimen of it during the previous year, 1883. He also stated in the same note that Mr. J. G. Jack, of Chateauguay Basin, P. Q., had also a very beautiful specimen of this moth, presumably taken in that locality.

In 1889, when looking into this matter, I wrote to Mr. Jack, at Jamaica Plain, informing him that I had found it recorded in the old minute book of the Montreal Branch that he had found the larva of what was probably a large species of Hepialus at Chateauguay, and asking him for particulars about this matter, and especially whether he had ever succeeding in rearing the larva to imago, or had taken this species there, and mentioning what Mr. Bowles had published in 1884. To this letter Mr. Jack replied that for two or three years in succession he had found a larva which he believed to be a Hepialus in the stems of Acer Spicatum, and one in a stem of A. Rubrum, and another in that of A. Pennsylvanicum; that the stems in which they were found were from one to two inches in diameter; that the borings extended from about a foot above the surface of the ground down into the rootstock, and that the point of exit

* Read before the meeting of the Entomological Club of the American Association for the Advancement of Science, at Madison, Wisconsin, August, 1893.

Digitized by Google

was usually but a few inches above the surface of the ground; that the larvæ were searched for and found in late fall or early winter, and that though about a dozen were found he did not succeed in breeding the imago; and finally that he never took *H. Thule* anywhere, but exchanged with the late Mr. Shaw, of Montreal, for a nice specimen which he afterwards gave to the Museum at Cambridge, Mass.

No further specimens, so far as I have been able to ascertain, were taken till 1885, in which year Mr. Shaw was so fortunate as to secure nine specimens. Mr. Shaw, to the great regret of our members in the Montreal Branch, died in 1886, and I was therefore unable to learn any further particulars from him.

In 1887 I searched in vain for the species, but in 1888 I was successful in discovering it, and took twelve specimens.

The locality where I discovered it, and which was probably the same as where Mr. Shaw had found it, is the brow of the old sea terrace of the post-pliocene period which extends for some miles east and west of Montreal, at a point in the municipality of Côte St. Antoine on the western outskirts of Montreal, and just above the St. Henry Swamp. I only found it in a very limited portion of this locality, not more than 400 or 500 feet in length, and supposed it was restricted to this very small area.

In 1889 I only secured six specimens, though I visited the locality much oftener, and in 1890 one just before starting on a trip across the continent, while in 1891 I only obtained two, and one other was taken by Mr. Winn.

From these facts I feared it was doomed to extinction in this locality, as the Canadian Pacific Railway runs along the brow of the terrace, and the swamp at its base is being drained and cultivated, and will be built over in a few years.

But last year we learned from one of our members that he had taken the species about three miles further west, but on the level swampy tract below the terrace, and some of our members went out on 15th July and two specimens were secured. This year Mr. Winn has traced it out all along this terrace, so that its range is much more extensive than we supposed.

The earliest date upon which I have taken it is 6th July, and the latest upon which I have heard of its being taken is 20th July of this year, but the specimens were worn and ragged.

The species seems to fly only for about fifteen to twenty minutes in

Digitized by Google

the twilight, as I have never taken it before ten minutes past eight, nor ever after half-past eight. Bright, clear evenings I have found much more favourable than cloudy ones, though I have visited the locality on many evenings without seeing one.

I have never succeeded in seeing where they came from, though I have stood watching intently for them for fifteen minutes or more before they appeared, but suddenly two or three would be in the air together, often out of reach of the net, swinging back and forth in their peculiar oscillating manner, though single individuals have been taken by others while flying along near the ground.

If touched by the net without being caught, they would drop into the grass apparently quite helpless. Six-sevenths of those which I have taken were males, but others have secured a more even division of the sexes.

One of the specimens taken in 1891 was a female, which I kept alive in order to secure eggs. It laid freely an enormous number, and I do not know whether it might not have laid more had it been kept alive longer. It was kept alive for two days in a wooden box, with gauze over the top, and seemed to hang perfectly quiet and to allow the eggs to run from her, as they were not attached, but loose in the bottom of the box. At the end of this time she was found to have been knocking about and spoiling her wings, and so was killed. The eggs were counted very carefully, and were found to amount to the enormous number of 2,151.

The following description was taken :—

Length, .027 of an inch.

Breadth, .022 of an inch.

Even oval, slightly flattened on lower side, perfectly smooth, but dull, like unglazed porcelain.

Colour, a pale honey-yellow when laid, soon turning black.

This female, however, must have been virgin, as the eggs speedily shrivelled, so that I was unable to obtain the young larvæ, or to make any of the experiments which I had contemplated in the direction of placing the eggs upon any likely food-plant. In connection with this subject several questions of great interest arise. It is well known that the moths of this family are very abundant in the Old World, one especially, *Hepialus Velleda*, swarming in Scotland in myriads, yet though we have a great many species on this continent, I do not think that any one can be considered other than very rare, except *H. Mustelinus*, which Packard reported (Proc. Ent. Soc., Phil., III., 394), as not uncommon at

Digitized by Google

Brunswick, Me., at light, and *H. Argenteomaculatus*, which is stated to be pretty generally distributed, though it is certainly not common in the imago state.*

Now, if the females in this genus produce over two thousand eggs each, it can be easily understood why they are so abundant in Europe, but why are they so rare on this continent?

Mr. D. S. Kellicott, who discovered the larva and pupa of *H. Argenteomaculatus*, found that that species bored in the roots of Alnus incana, but came up into the stem when mature, and Prof. J. B. Smith stated that it bred also in oak, willow and poplar. Mr. Kellicott stated in his paper upon this subject, which he read before this club at the Cleveland meeting, that after these nearly mature larvæ had come up into the stem, large numbers of them were destroyed by woodpeckers.

Upon reading this, it occurred to me that possibly this furnished the key to the mystery of the scarcity of these moths on this continent, and I therefore wrote to an ornithological acquaintance to ask if woodpeckers were more abundant on this continent than in the Old World. This gentleman replied that while he had no definite knowledge upon that question, he should judge that we had in Canada ten to twenty times as many woodpeckers to the square mile as they had in England.

I must, however, confess that even if this estimate be correct it is not an entirely satisfactory explanation, as there are on this continent a number of small species in this genus which no doubt feed in the roots of shrubs or herbaceous plants where woodpeckers would not be likely to find them, which are quite as rare as the larger species. I also wrote to Dr. Strecker to learn whether, so far as he knew, Thule had ever been found in any other locality than Montreal, to which he replied as follows:—"Some years since, an example of *Hepialus Thule* was taken somewhere in Wisconsin, I don't recollect where or by whom, but a sketch was sent me at the time for identification, which I immediately recognized as that species."

In regard to the life-history of the species in this genus, the English entomologists to whose works I have access are extremely vague. Stainton, in his Manual I., 109, says of the genus, "Larva feeding on the roots of plants," which leaves it very indefinite as to whether he means in the roots or tunneling in the earth and feeding on the roots. He even says that the larva of H. Hectus feeds on the leaves of dandelion, and F. O. Morris says "on the dandelion." Newman, "British Moths," does not commit himself as to Hectus, but of most of the others he says "on roots," but of H. Velleda he says "in thesubterraneous rhizome of the common brake, *(Pteris aquilina)*."

In spite of the very loose statements of English entomologists, I think there can be no doubt that the larvæ of this genus are internal feeders, as stated by both Harris and Packard.

*Since writing this paper Prof. J. B. Smith has called my attention to the fact that *H. McGlashani* is very abundant. See Ent. Amer., II., 15.

Digitized by Google

ON SOME UNDETERMINED BOMBYCES.

BY HARRISON G. DYAR, NEW YORK.

THIA (THELETHIA) EXTRANEA, Hy. Edw.

Mr. Andrew Bolter, of Chicago, has kindly sent me the type of this species for examination. It proves to belong to none of our families of Bombyces, as I had suspected. (See Journal N. Y. Ent. Soc., I., 98). On comparing the venation with *Pseudanaphora arcanella*, Clem.,* I find it to be essentially the same, differing only in details. Vein 2 of the secondaries is more remote from vein 3 in Thia than in Pseudanaphora, the lower fork of the discal vein ends between veins 4 and 5 instead of at origin of vein 4, and veins 5 and 6 arise from a common point instead of being well separated. Vein 8 (costal) present in both, strong, distinct, free, not 'apparently none.' On the fore-wings the venation is very similar in both. The second internal vein (submedian) is weak; the first strongly furcate at base. All the venules free, unbranched. Subcostal vein very remote from the costa, alt closely as in Pseudanaphora.

The fore-wings of this little moth are closely and heavily scaled above, glossy black; below of a gray brown, the veins slightly discolorous, the costa and fringe black. Hind-wings nearly hyaline, with but a few scattering scales; the fringe well developed, black.

Body parts black, the tongue pale, contrasting.

As the name Thia has been used before in entomology, the present Tineid genus may be known as *Thelethia*.

CISTHENE (CLEMENSIA) LACTEA, Stretch.

Mr. Beutenmüller has discovered a specimen of this species in the Edwards collection, without label. So far as I have been able to examine it, it does not violate the characters of Cisthene, but its coloration is so different from the other species of the genus that I would prefer to place it in Clemensia, with which it agrees perhaps equally well structurally.

PSEUDOPSYCHE (OEDONIA) EXIGUA, Hy. Edw.

According to the present arrangement, the synonymy of this species is as follows:—

Family, PSYCHIDÆ.

Genus, OEDONIA, *Kirby*.

*Determined by Prof. C. H. Fernald.

Digitized by Google

1893, Kirby, Cat. Lep. Het., I. 524.

|| *Pseudopsyche*, Hy. Edw.

1882, Hy. Edw., Papilio, II., 124.

O. EXIGUA, *Hy. Edwards.*

1882, Hy. Edw., Papilio, II., 125.

No characters have been published which would allow of giving the genus *Oedonia* a family location. Its reference to the Psychidæ is probably due to its colour only. The statement that the pectinations of the antennæ are furcate at the tips I am unable to verify, and I regard it as erroneous. The other characters which have been given are general ones.

I have examined Mr. Neumoegen's specimen, by the kind permission of that gentleman, and present my notes on the venation, as they may be of assistance to some one :—

Primaries.—Vein 1 free, straight, simple, not furcate at base, remote from internal margin ; median vein 4-branched, vein 2 arising beyond the middle of cell ; all the venules, veins 3 to 11 inclusive, simple, unbranched, arising independently and nearly equidistant from each other from the end of the cell. The cell is oval in shape, pointed at base. Vein 12 from the base of wing, free, about midway between the subcostal vein and costa.

Secondaries.—Three internal veins. (I am unable to make out vein 1a positively, owing to the condition of the specimen and to the fact that I cannot bleach the wing. Veins 1b and 1c are present, the latter in the normal position of the submedian fold). Median vein 4-branched, cell closed, the cross vein angulated between veins 5 and 6, with a discal fold from the angulation. Vein 6 arises half way from the angulation to the apex of cell, vein 7 from apex of cell ; vein 8 free from base, straight. The frenulum consists of a minute spine, apparently without any costal loop on primaries. The exact location of this genus I will leave to students of the Microlepidoptera. One of the type specimens is in the Edwards collection in the American Museum of Natural History, New York, the other in the collection of Mr. B. Neumoegen.

LIMACODES FERRIGERA, Walker.

Mr. A. G. Butler has very kindly sent me a good coloured figure of the type in the British Museum, and it proves to be *Adoneta spinuloides*, Clem.

Digitized by Google

GLUPHISIA SEPTENTRIONALIS, Walker.

DASYCHIRA CLANDESTINA, Walker.

Both these names refer to *G. trilineata*, Pack., and both antedate it. Mr. Butler has sent me a sketch of *septentrionalis* and notes on it, and Mr. J. A. Moffat has compared the type of *clandestina* with specimens of *trilineata*, and writes me that "it is, so far as I can make out, almost identical with what we have under the name of *Gluphisia trilineata*." The synonymy will be :—

G. SEPTENTRIONALIS, Walker.
1855, Walker, Cat. Brit. Mus., IV., 1038, *Gluphisia ?*
1882, Grote, check list, p. 18, *pr. syn. trilineata ?*
clandestina, Walker.
1861, Walker, Can. Nat. & Geol., VI., 36, *Dasychira.*
1877, Grote, Can. Ent., IX., 21, *Gluphisia.*
trilineata, Packard.
1864, Packard, Proc. Ent. Soc. Phil., III., 355.

ICHTHYURA APICALIS, Walker.

As suggested by Dr. Packard (Ent. News, IV., 79), this species proves to be *I. vau*. Mr. Butler has sent me a coloured figure of it. The name takes precedence, and we have :—

I. APICALIS, Walker.
1855, Walker, Cat. Brit. Mus., V., 1058.
vau, Fitch.
1859, Fitch, 5th Rept. Nox. Ins. N. Y., 65.
indentata, Packard.
1864, Pack., Proc. Ent. Soc. Phil., III., 352.
ornata, Grote and Robinson.
1868, G. and R., Trans. Am. Ent. Soc., II., 191.
incarcerata, Boisduval.
1868, Boisd., Am. Soc. Ent. Belg., XII., 86.

Not to mention the synonymy of the paler form.

CERTILA FLEXUOSA, Walker.

I have shown Mr. Butler's figure of this to Prof. J. B. Smith, and he feels sure that it represents *Raphia frater*. This removes the name from the list of undetermined Bombyces.

Mr. Butler deserves hearty thanks for his kindness in assisting us to determine these names.

Digitized by Google

THE MESILLA VALLEY COTTONWOOD LEAF-MINER DETERMINED.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA.

Among the first insects which I found upon my arrival in the Mesilla Valley of New Mexico, in March, 1891, was a small sawfly. My notes on this species were made as follows at the time :—

March, 1891.—Specimens of a small yellowish and brownish sawfly were found quite abundant flying everywhere from middle to last of March. They were not found on any plant, but their numbers make it probable that they will turn up as injurious to some plant. Det. by Dr. Riley as *Blennocampa*, nov. sp.

In an article in Zoe., vol. iii., p. 234–6, Oct., 1892, under the title of a leaf-miner of *Populus fremontii*, I described the larvæ, there supposed to be tineid, and gave an account of their great destructiveness to the foliage of these trees in the Mesilla Valley in 1891 and 1892. All attempts to breed the miner were futile.

However, in April, 1893, the trees were watched carefully during the time when the leaves were opening. The result was that on April 9th, adult sawflies were found very numerous on the cottonwoods, flying about and (apparently) ovipositing in the partially opened leaf bunches. The leaves were one-third to one-half opened at the time.

Specimens of these sawflies were captured on the spot. On being carefully compared with the specimens taken in March, 1891, which, as above mentioned, had been determined by Dr. Riley as a new species of *Blennocampa*, they were found to be the same. Dr. Riley has since expressed doubt *in litt.* that the two were the same. Though I did not breed the species, I am sure quite beyond any doubt that the sawflies caught April 9, 1893, are the adults of the leaf-miner referred to as described in *Zoe.* I am quite as certain also of the identity of these sawflies with the *Blennocampa*, n. sp., determined in 1891 by Dr. Riley.

Dr. Riley has given me *in litt.* the MS. name *Blennocampa populifoliella* to use for this species. I therefore place these notes on record, so that my stand in the matter may be known. It appears that the precise name of the cottonwood of the Mesilla Valley is *Populus fremontii*, Watson, var. *wislizeni*, Watson, as Prof. Cockerell has pointed out to me. (See Bull. 2, Forestry Division, U. S. Dept Agric., 1889, p. 188).

I should also point out that I found in New Mexico other tenthredinid (?) leaf-mining larvæ in *Populus angustifolia*, in the Canada Alamosa (see Journ. N. Y. Ent. Soc., i., No. 2), which belong to a different genus without doubt.

Digitized by Google

DESCRIPTIONS OF SOME SPECIES OF COLEOPTERA OCCURRING NEAR ALLEGHENY, HERETOFORE UNDESCRIBED.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Preparatory to the publication of a list of the Coleoptera of this vicinity, it has been thought proper to characterize and name the following forms:—

Bembidium postfasciatum.—Coppery-bronzed, dark beneath, elytra pallid, two dark fasciæ. Head convex, impunctate, longitudinally impressed on each side between the eyes, coppery-bronzed; antennæ with three basal joints pale, the others fuscous; thorax quadrate, base and length equal, wider at middle, base truncate, basal striæ double, hind angles rectangular, carinate, dorsal line deep, coppery-bronzed, often tinted green in the basal impressions; elytra pallid, silvery white in life, elongate oval, broadly deeply impressed transversely behind scutellum, deeply striate, striæ dilated before middle and coarsely punctured, punctures finer towards apex, intervals convex, third bipunctate, a broad undulated dark fascia behind middle, another before apex sometimes interrupted at the suture and sides; underside dark, often with a greenish reflection; legs entirely pallid. Length, .18–.21 inch. Characterized from 8 examples. Habitat: Palludial places along streams; not common, but abundant when found. This species has been distributed as a variety of *dorsale*, Say, from which it is abundantly distinct; in that species the head and thorax are brilliant green, the impressions of the thorax less dilated, the striæ of the elytra finer, not dilated near base and with finer punctures, the intervals flat; the fasciæ narrower and less conspicuous, a greenish space around the scutellum and scarcely evidence of a transverse impression.

Platynus parmarginatus.—Elongate, depressed, dark above, antennæ, mouth parts, underside, epipleuræ and reflexed margins of thorax ferrugineous, with a tendency to piceous on the abdomen. Head with deep frontal impressions, a little narrower than the thorax within the marginal reflexions; thorax quadrate, widest at middle, narrowed to apex and base by a curved line, anterior angles prominent, obtusely rounded, posterior obtuse, side-margins uniformly and widely reflexed, discal line fine not reaching base, length and greatest width equal; elytra deeply sinuate at apex, striate, intervals convex, the third with four punctures. Length, .30–.38 inch. Characterized from 30 examples. Habitat:

Digitized by Google

Channels of spring runs on hills dry in summer; not common, but abundant when found. This has been distributed as a variety of *reflexus*, Lec., from which it is very distinct, the latter being much larger, with a more elongate and differently shaped thorax, tripunctate elytra, and piceous underside and legs. *P. cinctus* has the same form of thorax with *parmarginatus*, but the reflexed margin of the thorax is much narrower anteriorly than posteriorly; the thorax of *reflexus* is perceptibly longer, a little coarctate on the sides before base, widest one-third from apex, and may be termed lyriform.

Stenelophus humidus.—Piceous black, shining, basal joint of antennæ and feet pale. Head short, two-thirds as wide as thorax, smooth, antennæ brown except basal joint, very pilose; thorax quadrate, a little narrowed behind, sides curved, basal angles rounded, scarcely obtuse, impunctate, discal line fine, sometimes obsolete, basal impressions shallow, impunctate, often with minute rugæ, lateral edge narrowly ferrugineous; elytra with impunctate striæ, intervals scarcely convex, the third with a minute puncture at apical third, somewhat iridescent, extreme sutural and marginal edge sometimes pale; scutellar striæ at most rudimentary, frequently invisible; in the ♂, middle and anterior tarsi have the fourth joints deeply bilobed. Length, .18–.20 inch. Characterized from 15 examples. Habitat: Grassy swampy places in meadows and about springs. Abundant. Distinct from *S. plebeius*, which it closest resembles, by its smaller size, less rounded thorax, obsolete scutellar striæ, and other characters seen on comparison. This species has been distributed as Stenelophus, N. S.

Soronia substriata.—Oval, length twice the width, much depressed, pubescent, sordid, rufescent.

Head finely punctulate, a transverse row of minute tubercles and some scattering ones, antennæ brown, fourth joint scarcely shorter than third, antennal grooves nearly parallel; thorax two and one-half times wider than long, apex deeply emarginate, base truncate, sides regularly curved, incurved a little at base, side margins widely explanate and moderately reflexed, medial line indistinct, surface not indented, densely finely punctured to the extreme margin, pubescence fine and matted together on the disk with a brown indument producing a granulated appearance; elytra widest at the base, sides forming with those of the thorax, except the sinuation at base, a regular oval curve and with continuous broad reflexed margins, feebly costate or substriate, densely finely punctured, setose,

Digitized by Google

pubescence dense, very short and matted on the disk with indument, the margins translucent when cleaned; beneath shining, rufopiceous, undermargin of thorax and elytra very broad and smooth, and with the venter very densely, scarcely visibly punctate. The mentum and its appendages are different from those in the other species, but to be understood a figure is necessary; the strial arrangement is more distinct than in *undulata* or the European *grisea;* there is no appearance of maculation except from abrasion. The indument, whether natural or acquired, could probably be removed like that on *grisea* by washing with ammonia, and when cleaned the surface would be rufous. Only two examples occurred in May under maple *(acer rubrum)* bark.

Corymbites elongaticollis.—Black, sericeo-pubescent; head coarsely confluently punctured, front a little depressed, antennæ, ♂ a little longer than head and thorax, ♀ a little shorter, serrate from the second joint, 3rd scarcely longer than 4th, 11th constricted slightly near tip; thorax one-half longer than wide, not very convex, a little roundly narrowed from middle to apex, slightly constricted before the hind angles which are divaricate and carinate, obsoletely canaliculate at base or not, finely and closely punctured especially on the sides, a little shining when the pubescence is rubbed off; elytra not wider than thorax than which they are twice longer, uniformly narrowed from base, striæ of moderate depth, intervals convex and closely punctured with fine punctures causing a rugous appearance, finely sericeo-pubescent; femora and tibiæ piceous; tarsi rufescent beneath, very slender, 1st joint just perceptibly longer than 2nd, 5th as long as 3rd and 4th conjointly; abdomen sericeous, finely densely punctulate, prothorax and side pieces more coarsely. Length, .32–.45 inch. Described from six examples; not uncommon in Western Pennsylvania, and I took an example at Parry Sound, Ontario. It varies greatly in size. In the series it should be placed near *tarsalis* or *mendax*.

Hemiptychus castaneus.—Elongate-oval, widest at base of thorax and elytra, rufocastaneous, pruinosely pubescent, excessively finely punctulate; thorax at base sinuate each side of middle, obliquely truncate and separated externally from the base of the elytra by an indentation for the knees of the middle feet, external two striæ finely impressed from the middle continuously around the apex uniting with the short apical impressions of the 1st and 2nd striæ, and in two examples traceable anteriorly to the humerus, from which in one of these is an evident third

Digitized by Google

stria ending at the middle; as indistinctly punctulate below as above. Length, .05 to .08 inch. Described from 4 examples.

The pubescence is excessively fine, pruinose in appearance and lightly attached; when removed the surface seems highly polished, but with a good glass is seen to be densely punctulate. The smooth species of Hemiptychus, while readily separable by the eye, are not easily made known by description.

This species is next to *nigritulus*, the most common near Allegheny and Pittsburg. On vaccineæ and other low bushes; June, July; not abundant.

Isomira ruficollis.—Piceous black, thorax, mouth parts, tibiæ and tarsi ferrugineous. Head densely finely punctulate, transversely impressed between the antennæ, antennæ brown, one-third longer than head and thorax, in both sexes, third and fourth joints subequal, each not much longer than one of the following; thorax at extreme apex as wide as long, twice wider at base, very graduately narrowed from base to near apex and then suddenly incurved, margin exceedingly fine, base not or slightly sinuate each side of middle, hind angles slightly acute, dorsal line often scarcely evident, two or more vague discal impressions sometimes present, punctulation exceedingly fine and dense, dull from a dense microscopic pubescence; elytra at base scarcely wider than the thorax, slightly dilating to apical fourth, sutural stria not impressed before middle, 2nd not evident beyond apical 3rd and no traces of the others; closely, moderately, coarsely, uniformly punctuate over the whole surface, each puncture bearing a short inconspicuous hair, shining; underside punctulate like the upper, metasternum and side pieces more coarsely; length, .17–.21 inch. Described from eight examples.

Not rare on bushes near wet places. The elytra at full maturity are shining black, more or less brownish when immature. In some examples there is an undefined dark spot on the disk of the thorax. In this species, as well as in many other Cistelides, the antennæ differ much in length among individuals of either sex, also in the length of the joints; and the same is true in regard to the distance between the eyes; therefore, these characters are of little value for the separation of the species.

Acalles curtus.—Inflated, without erect setæ, unicoloured, cinereous. Head and beak, except at tip, finely granulato-punctate, punctures concealed by indument; thorax equally wide at apex and base where the width and length are subequal, one-fourth wider at middle, sides arcuately

Digitized by Google

rounded, disk notably depressed before the scutellum. Surface, when deprived of concealing indument, granular from the density of the punctuation, and with a polished dorsal line, elytra convex, inflated at middle, measured across the convexity as wide as long, roundly contracted from the middle to base where the width equals that of the thorax, posteriorly strongly declivous, deeply and widely striate, punctures large and distant, intervals convex and narrow with a crenate appearance; legs granulato-punctate and coated like the head and thorax. The punctures contain exceedingly short curved bristles visible only when sought for. Length, .08–.10 inch. Described from 4 examples. Easily known from all our species as yet described, by the absence of erect setæ and patches of scales on the elytra, as well as more globose form. Occurs near Allegheny, Pa., in April, about beech trees *(Fagus ferruginea)*, under stones where it has hibernated, but is not often found.

Pachybaris strigapunctus.—Bariform, black, shining, tarsi piceous. Beak polished, slender, long, arcuate; that of ♂ punctate at base and finely irregularly lineate to apex when carefully viewed; that of ♀ scarcely longer, punctate and lineate at base to the insertion of the antennæ; first joint of antennæ nearly three times longer than second, which is one-half longer than third, 3 to 7 equal in length but increasing in thickness, the 7th rather suddenly; thorax wider than long, convergent from base forward, suddenly constricted at apex for the insertion of the head, base with a long scutellar-lobe on each side of which it is slightly sinuate, finely, closely strigate in longitudinal wavy lines, scatteringly punctured especially near the apex, a fine median line from apex to scutellum; elytra a little wider than the thorax, twice longer, widest at middle, finely striate, striæ not obviously punctured, intervals flat, uniseriately punctured, each puncture containing a white scarcely projecting hair or seta; underside, pro- and meso-thorax and legs rather coarsely closely punctured, venter more finely, white setæ of the punctures more conspicuous than above; tibiæ roughly striate and punctured. The ♂ has an acute tubercle before the anterior coxæ, in one example a spine as in some *Centrinus;* the anterior coxæ are not widely separated, the prosternal cavity is well marked but not incised. Length, .12 to .15 inch. Characterized from 3 ♂ and 3 ♀ examples. Occurs in May and June on *Cratægus*, but not abundantly.

Balaninus confusor.—Form, colour and vestiture the same as in *B. nasicus.* Rostrum in both sexes thickened and punctured at base, that of

Digitized by Google

the female not exceeding three-fourths the length of the body, and the antennal scape equaling the three basal joints. Hind femur with an oblique medium-sized tooth; claws with appendices acute. Length, .24 to .28 inch. Described from 5 ♂ and 5 ♀ examples. The foregoing characters will readily separate this species from any with which it is likely to be confused:—The oblique femoral tooth and acute claw appendix, from *B. nasicus* which it most resembles; the longer antennal scape of the ♀ and the beak thickened and punctured at base in both sexes, from *B. uniformis;* the acute claw appendices, denser vestiture and *nasicus* shape, from *obtusus*. Abundant in western and south-eastern Pennyslvania, West Virginia, south-eastern Ohio, Massachusetts, and North Carolina. Blanchard. For further comparative characters, see CAN. ENT., xxii., 7.

I have obtained this species from the acorns of *Quercus ilicifolia*, but it probably depredates on the fruit of other species of oak. An example was also obtained from one of the large apple-galls of *Solidago nemoralis;* these galls are composed of a compact porous mass caused by the larva of a fly named by Fitch *Acinia solidaginis* (Rep. 1st). The gall contained three coleopterous larvæ after the fly escaped, one of which developed the next year and turned out to be this species. Oviposition on this gall can scarcely have been otherwise than a mistake on the part of the parent.

NOTES AND QUERIES.

BY REV. W. J. HOLLAND, PH. D., ALLEGHENY, PA.

I have just received a specimen of an Erebus odora, which was captured last Wednesday evening (Sept. 27th) in the lecture-room of the First United Presbyterian Church, in the city of Allegheny, where its appearance caused no little consternation among the devout "mothers in Israel" who were at prayer meeting, and who thought it was a bat, of which evil things are said by the unsophisticated. It is a male in good case. This is the third specimen I have received this summer. The first was taken about four weeks ago in the cellar of my father's residence in Bartholomew County, Indiana. The second was taken at Jeannette, Pa., near a spring-house. All three specimens are fresh in appearance, as if not long from the chrysalis. Undoubtedly this great moth is more than an occasional visitor from the tropics, and should be reckoned as belonging to our fauna, though scarce. Its capture has been recorded north of the Ohio and Potomac many scores of times, and it has been taken repeatedly in Canada.

Digitized by Google

Papilio Cresphontes, for the first time, has been taken this summer in the neighborhood of Pittsburgh, and in considerable numbers. One collector obtained four specimens in one locality. The food-plant is Zanthoxylum and Ptelea in these parts. In Florida its larva is abundant upon the orange and lemon trees.

One of the commonest of our Papilios is Philenor. Here its larva is found upon Aristolochia. In southern Indiana, in Bartholomew county, I have observed it summer after summer, sometimes in immense numbers. It is one of the commonest butterflies there, as here. But, with the exception of one or two specimens of Aristolochia growing about verandahs in the village of Hope, I think I may safely say there is not a plant of Aristolochia within many miles of the fields in which I have counted the perfect insects by the score. What is the other food-plant upon which the larva feeds? It runs in my mind that I have read that the caterpillar has been found upon the smart-weed (*Polygonum hydropiper*), but I cannot recall where I have seen this statement made. I have never been able to verify it by observation. Perhaps some reader of the CANADIAN ENTOMOLOGIST may be able to throw light upon the subject.

The banana merchants in our town have proved themselves possessed of curious entomological stores. I have received from them a couple of living tarantulas, and not long ago a living specimen of Caligo Teucer, which had emerged from a chrysalis hidden in a bunch of bananas. The insect had been transported by sea and land from either Honduras or some port in the northern portion of South America, a journey of several thousand miles. This reminds me that in several consignments of eastern Lepidoptera I have found our Danais plexippus, Linn. One of the sendings was from Borneo, the other from Java. We shall soon hear of its domestication on the mainland of Asia, and it will probably spread all over China and Japan. The insects taken by the U. S. Eclipse Expedition of 1889, at the Azores, numbered among them two specimens of this butterfly. There were only about a dozen specimens of insects taken at the Azores by the industrious naturalists of the party, and I judge that it must be common there. Why we have not yet heard of its domiciliation on the African continent is a mystery to me. It will no doubt get there before long.

I have a specimen of Limenitis taken in Warren county, Pa., this summer, which is most remarkable. It has all the markings of L. ursula,

Digitized by Google

but both the primaries and secondaries are crossed by very broad, white bands, as in L. arthemis. It is, however, larger than any specimens of Arthemis I have ever seen, and exceeds the majority of L. ursula in size. It has the white spots in the cell of the primaries which appear in some female specimens of L. Weidemeyeri. It is altogether a queer beast combining the characteristics of three of our species. No doubt they all sprang from a common ancestry, and this specimen reveals the force of atavism.

EXOCHILUM MUNDUM, SAY, ATTACKING THE FALL WEB-WORM.

BY A. H. KIRKLAND, ASSISTANT IN THE AMHERST, MASS., INSECTARY.

One hot afternoon in the early part of August, 1893, while out collecting, I found a large web of the Fall Web-Worm (*Hyphantria cunea*, Drury), on a young apple tree. Reaching up to cut off the twigs to which the web was attached, my attention was attracted by an unusual disturbance among the inmates of the web. Closer inspection revealed the fact that a medium-sized Ichneumon fly had intruded within the family circle, and was proving herself a most unwelcome visitor. Tearing into the web with her feet she would force her way along until she arrived under the skeletonized leaves upon which the larvæ were resting and through which they were plainly visible. When her presence was noticed by the larvæ lying on a large leaf nearest the intruder, they raised their heads and swung them rapidly from side to side, and at the same time each one emitted a drop of greenish fluid from its mouth. Meanwhile the Ichneumonid had crept up under the leaf, and bending the posterior segments of her abdomen until the partly exserted ovipositor extended forward between the feet and beyond the head, she poised herself for a moment as if to take aim, then with lightning rapidity she darted her abdomen and ovipositor still farther forward and struck through the leaf into the body of a larva, which at once commenced to writhe and twist as if in great pain. I watched this operation continue for about half an hour and did not observe the Ichneumonid sting any larva more than three or four times, usually but once.

Upon attempting its capture it broke out of the web and flew off. Soon, however, it returned, and after circling about for a short time as if to select a favorable place for renewing operations, it alighted and again forced an entrance into the web. This time my efforts were successful, and my capture, as kindly determined by Prof. Fernald, proved to be *Exochilum mundum*, Say. The larvæ that had been stung were brought to the Insectary for the purpose of obtaining more specimens of this interesting Ichneumonid.

Digitized by Google

NORTH AMERICAN THYSANURA—IV.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Most modern European writers follow Tulleburg in placing all the Collembola in the family *Poduridæ*, and including the *Poduridæ*, *Lipuridæ* and *Anouridæ* of Lubbock in the subfamily *Lipurinæ*. It would seem more natural to restrict the name *Poduridæ* to those genera bearing the saltatory apparatus on the antepenultimate abdominal segment, instead of the penultimate, and then to include those genera in which the saltatorial apparatus is wanting under the name *Aphoruridæ*.*

APHORURIDÆ, nom. nov.

Body naked, generally small; antennæ four-jointed; ocelli present or absent; postantennal organ usually present; tarsi with one or two claws; furcula wanting.

The genera belonging to this family can be readily separated by means of the following table:—

A. Mouth parts not produced cone-like beneath the head.
  B. Tarsi with two distinct claws..... *Aphorura.*
  BB. Tarsi with a single stout claw.
    C. Postantennal organ wanting..... *Bourletia.*
    CC. Postantennal organ present.
      D. Anal spines present; postantennal organ transverse..... *Tullbergia.*
      DD. Anal spines wanting; postantennal organ circular..... *Anurida.*

AA. Mouth parts produced cone-like beneath the head.
  B. Ocelli present, three on each side of the head..... *Neanura.*
  BB. Ocelli wanting..... *Aphoromma.*

Aphorura,† gen. nov.—Ocelli wanting; antennæ four-jointed; postantennal organ present; ocellate punctures at base of the antennæ present; lower claw of tarsi distinct. Type, *Podura ambulans*, Linn.

Proposed for Lipura, Burm., which is preoccupied in Mammology.

Bourletia, gen. nov.—Ocelli sixteen, eight on each side of the head; antennæ four-jointed; ocellate punctures, postantennal organ, anal spines and lower tarsal claw wanting. Type, *Anurophorus laricis*, Nic.

Lipura and *Anura* are both preoccupied in zoology.

†α, priv.; φορός, ferens; οὐρά, cauda.

Digitized by Google

Tullberg uses *Anurophorus*, Nic., for this species, but both *Anurophorus* and *Adicranus*, Bourl., have *Podura fimetaria*, Linn., as type, which belongs to *Lipura*, Burm. The genus is named for the Abbe Bourlet, a well-known writer on Thysanura.

Tullbergia, Lubbock.—Ocelli wanting; antennæ four-jointed; postantennal organ present; lower claw of tarsi wanting; anal spines large, stout; body elongate. Type, *Tullbergia antarctica*, Lub.

Anurida, Laboulb.—Ocelli ten, five on each side of the head; antennæ four-jointed; postantennal organ present; ocellate punctures, lower claw of tarsi, and anal spines wanting. Type, *Achorutes maritimus*, Guer.

Anurida maritima, Guer.—Body plumbeous, sparsely covered with long hairs; head triangular, produced between the antennæ, broadly truncate in front, broadly emarginate behind; antennæ shorter than the head, basal segment large, globular, one-half broader than the other segments, second segment a little longer than the first, the third and fourth closely joined, as long as the first and second together; eyes five, two in front and three behind; postantennal organ with seven prominences, arranged in the form of a circle; legs short and stout, covered with long stiff bristles; claws long, blunt, one-half the length of the tibia. Length, 3 mm.

Habitat: Eastern coast of the United States, Europe.

Neanura, gen. nov.—Ocelli six, three on each side of the head; antennæ four-jointed; postantennal organ present or wanting; ocellate punctures, anal spines, and lower claw of tarsi wanting; mouth parts produced cone-like beneath the head. Type, *Achorutes muscorum*, Temp.

Proposed for *Anoura*, Gerv., which is preoccupied in Mammology.

Aphoromma,‡ gen. nov.—Ocelli wanting; antennæ four-jointed; postantennal organ present; ocellate punctures, anal spines, and lower claw of tarsi wanting; mouth parts produced cone-like beneath the head. Type, *Anoura granaria*, Nic.

PODURIDÆ.

Body cylindrical, naked, usually small; antennæ four or five-jointed; eyes present, with ten to thirty ocelli; postantennal organs usually wanting; tarsi with one or two claws; furcula present, attached to the fourth abdominal segment.

‡*a*, priv.; *φορός*, ferens; *ὄμμα*, oculus.

Digitized by Google

The genera belonging to this family, as restricted above, can be separated as follows :—

A. Mouth parts not produced cone-like in front of the head.
  B. Antennæ four-jointed.
    C. Tarsi with two claws.
      D. Abdomen without anal spines.....*Achorutes.*
      DD. Abdomen with anal spines.
        E. Abdomen with two anal spines.....*Schoturus.*
        EE. Abdomen with four anal spines...*Tetracanthella.*
  CC. Tarsi with a single claw.
    D. Ocelli twenty-eight or thirty, fourteen or fifteen on each side of the head ; anal spines wanting.....*Podurhippus.*
    DD. Ocelli less than twenty-eight.
      E. Anal spines wanting.
        F. Furcula long, reaching beyond the apex of the abdomen, arcuate.....*Podura.*
        FF. Furcula short, never extending beyond the apex of the abdomen, not arcuate.
          G. Legs long, distinctly visible from above.....*Pseudachorutes.*
          GG. Legs extremely short, not visible from above.....*Brachysius.*
      EE. Anal spines present.
        F. With two anal spines.....*Xenylla.*
        FF. With more than two anal spines.
          G. With three anal spines.....*Triæna.*
          GG. With four anal spines .....*Oudemansia.*
  BB. Antennæ five-jointed.....*Lubbockia.*
AA. Mouth parts produced cone-like in front of the head.*Gnathocephalus.*

Achorutes, Temp.—Ocelli sixteen, eight on each side of the head ; postantennal organ wanting ; antennæ short, four-jointed ; body cylindrical, segments sub-equal ; tarsi with two claws ; anal spines wanting. Type, *Achorutes dubius*, Temp.

Achorutes longispinus, sp. nov.—Body cylindrical, purplish-black, hairy ; head large, rounded in front, truncate behind, prolonged between the antennæ, acutely triangular ; eyes on a small black patch almost directly behind the antennæ in the middle of each lateral half of the head ; antennæ about as long as the head, basal joint globular, minute, incon-

Digitized by Google

spicuous, set in an excavation beneath the frontal projection, second and third joints subequal, globular, fourth joint elongate, as long or longer than the three basal joints, cylindrical, pointed, the inner side at apex appearing truncated; legs stout; claws large, inner claw more than half the length of outer, outer with a denticle at base; furcula elongate, reaching the hind pair of legs; manubrium large, reaching beyond the apex of the abdomen, sides straight, sub-parallel; dentes elongate, as long as the manubrium, broadest at middle, underside with two or three rows of stiff spines; mucrones short, not longer than broad, with an apical and a preapical tooth. Length, 1–1.25 mm.

Habitat: Alameda, near Las Cruces, New Mexico.

Received from Mr. Theo. D. A. Cockerell, who had received them from Mr. E. VanPatten, "who found them in immense numbers at Alameda."

Schoturus,‖ gen. nov.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ short, four jointed; body cylindrical, segments sub-equal; tarsi with two claws; anal spines present, two. Type, *Podura nivicola*, Fitch.

This genus is proposed for those species at present placed in the genus *Achorutes* and which have anal spines.

Tetracanthella, Schott.—Ocelli sixteen, eight on each side of the head; postantennal organ present; antennæ four-jointed; tarsi with two claws; anal spines present, four, arranged in two rows; furcula short. Type, *Tetracanthella pilosa*, Schott.

Entom., Tidsk., XII., 1891, 191; fig.

Podurhippus, Megnin.—Ocelli twenty-eight or thirty, fourteen or fifteen on each side of the head; antennæ four-jointed; tarsi with a single claw; furcula short, slender; ventral tube tuberculate, bilobed. Type, *Podurhippus pityriasious*, Megnin.

Bull. Soc. Ent. Fr. (5), VIII., 1878, p. cxxxv.; Les Parasites, 1880, p. 104; fig. 42.

Podura Linn.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ four-jointed; tarsi with a single claw; furcula long, slender, arcuate; anal spines wanting. Type, *Podura aquatica*, Linn.

Podura granulata, sp. nov.—Body, legs and antennæ bluish-black;

‖σχότος, obscurus; οὐρά, cauda.

Digitized by Google

antennæ long and slender, longer than the head; head with a quadrangular tubercle between the eyes; thorax slender, much narrower than the head; legs short and stout; claws long and slender, as long as the tibia and tarsus together; tenant hair present; furcula long and slender, reaching the first pair of legs, densely covered with closely placed, blunt, spiny tubercles, the tubercles arranged in transverse rows around the spring, giving the spring a striated appearance with a low objective; manubrium short and stout, apex produced between the dentes broadly triangular; dentes long, slender, a few scattered hairs, and indications of a transverse suture at middle; mucrones short, pointed, with a triangular tooth at base. Length, 1.25 mm.

Habitat: Tennessee.

Collected in great numbers by Prof. H. E. Summers from the surface of thin, slimy mud.

Pseudachorutes, Tullb.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ conical, four-jointed; tarsi with a single claw; furcula short, reaching the apex of the abdomen; anal spines wanting. Type, *Pseudachorutes subcrassus*, Tullb.

Brachysius,§ nov. gen.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ short, not longer than the head is broad, four-jointed; tarsi with a single claw; furcula short, not reaching the apex of the abdomen nor the ventral tube; anal spines wanting; legs short and stout, not reaching the side of the body. Type, *Brachysius dilatatus*, sp. nov.

Brachysius dilatatus, sp. nov.—Bluish mottled with gray; antennæ short, not much longer than the head, first joint very small, second and third subequal, fourth almost as long as second and third together; body long and slender, broader towards the caudal end; legs short and slender, not extending beyond the side of the body; furcula short and slender; anal papillæ small, not divided, covered with stiff bristles. Length, 2 mm.

Habitat: Ithaca, N. Y.

This species has the habitus of those of the genus *Neanura*, but can be readily distinguished by the number of ocelli and by the presence of the furcula.

Xenylla, Tullb.—Ocelli ten, five on each side of the head; postantennal organ wanting; antennæ four-jointed; body cylindrical; tarsi with a single claw; anal spines present, two. Type, *Xenylla maritima*, Tullb.

§βραχύς, brevis; ὐσσός. jaculum.

Digitized by Google

Triæna, Tullb.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ four-jointed, conical; tarsi with a single claw; furcula extremely small, papilliform; anal spines present, three. Type, *Triæna mirabilis*, Tullb.

Oudemansia, Schott.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ short, four-jointed; body cylindrical, segments subequal; tarsi with two claws; anal spines present, four, arranged in a circle around the apex of the abdomen; furcula not attaining the ventral tube. Type, *Oudemansia cærulea*, Schott.

Entom. Tids., XIV., 1893, 174; pl., II., 1–7.

Lubbockia, Haller.—Antennæ five-jointed, longer than the body; all the tarsi with tenant hairs, small on the front and middle pairs; anal spines present, two; furcula small; body cylindrical, segments subequal. Type, *Lubbockia cærulea*, Haller.

Mittheil. Schweiz. Entom. Ges., VI., 1880, 4.

Gnathocephalus,* gen. nov.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ short, conical, four-jointed; body cylindrical; tarsi with a single claw; anal spines wanting: furcula short, not attaining the ventral tube; mouth-parts folded together in the form of a tube and projecting in front of the head. *Gnathocephalus complexus*, sp. nov.

Gnathocephalus complexus, sp. nov.—Body robust, broadest behind, bluish-black, a row of paler spots down each side, and a few scattered hairs on the caudal end; head small, triangular, strongly produced between the antennæ, broadly truncate in front; eye spot small, on a raised tubercle; antennæ slightly longer than the head, basal segment a little longer than broad, broadest at middle, second segment as broad as the first and slightly shorter; third and fourth segments sub-equal, longer than the first and second, and much narrower, the suture between them not distinctly indicated; legs long and slender, with lighter markings and scattered regularly placed bristles; tenant hairs wanting; claws stout; furcula short, stout; manubrium half as broad as the abdomen, nearly as broad as long, slightly incised between the dentes; dentes two-thirds the length of the manubrium, cylindrical, narrowed at apex; mucrones one-half the length of the dentes, slightly arcuate, without teeth. Length, 3–4 mm.

Habitat: Olympia, Washington. (Trevor Kincaid, collector.)

*Γνάθος, maxilla; Κέφαλὸς, caput.

Digitized by Google

ON THE EUDRIINÆ.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In an original memoir on the *Zygaenidæ*, published by the Essex Institute, Dr. Packard explained the relation of *Castnia* and allied genera to the European genus *Zygaena*, and contended for the solidarity of the group as the equivalent of the large family of *Bombycidæ* in the Latreillean sense. The view, advocated by Agassiz, that *form* was a family criterion, not only form in general, but form of parts underlying form in general, obtained. Of a truth Dr. Packard's "family," *Zygaenidæ*, contained genera more or less evidently related in one or other of their stages, and the agreement which Dr. Packard found in the form of the clypeus authorized their being brought together in a family group. This view has been followed by me in my papers and lists, and any adverse criticism of my particular course with regard to these insects is consequently ill-founded; while the inherent want of precision which our classifications must present allows of a shifting opinion, within limits, as this or that character appears in turn to be the decisive one, and renders such criticism unnecessary. The tendency of classificators latterly has turned in the direction of a breaking up of these "families" into smaller groups still called "families," but based rather upon ultimate peculiarity than "form." Under the vague term "Bombyces," the various new families of the Spinner moths are still kept together, in recognition of a less tangible relationship which nevertheless is still held to exist; while the view, that the present representation of these families is the modified survival of the roots of the lepidopterous tree, is being seriously considered by students of phylogeny. Classificators of the lepidoptera who seize only upon ultimate peculiarities of a common and essential part of the perfect insect, will, in the nature of things, eventually come to grief. Such modifications we may use to separate species, and, when so evident as to be of practical service, in the more artificial region of generic division; but, as we ascend higher, they diminish in importance and are superseded by characters of development, persistent or evanescent, offered in different stages of growth of the species. By these characters indications as to the truer affinities of the insect are given. The time is perhaps going by when lepidoptera are to be solely classified by final peculiarities of the legs, wings or tails of the perfect insect. Still, there will always be those whose observations in these directions will seem to themselves of prime importance, while, in the end, the value

Digitized by Google

of their observations will be differently expressed in our classifications. The family "*Zygaenidæ*" has shared the fate of disintegration with the family "Bombycidæ." Dr. Packard now recognizes three family groups: *Agaristidæ*, *Castniidæ* and *Zygaenidæ*. The sub-family *Eudriinæ*, as I would consider it, the subject of the present notice, belongs, with the sub-family *Alypiinæ*, to the *Agaristidæ*. The present sub-family seems to be exclusively American; at least I have met in literature with but one extra limital form, the African genus *Ovios*, which may possibly belong here. The general form of the perfect insect recalls that of the *Noctuidæ*, so that Hübner considers it one, while Boisduval proposes the genus *Eudryas* for the typical generic group and apparently recognizes its structural affinities to *Castnia*. The larva, as we now know, is closely allied to that of *Alypia*. The genera of the *Eudriinæ* may be briefly distinguished as follows:—

1. Structure of the male wings normal,	2.
Structure of the male wings abnormal.	*Euscirrhopterus*, *Grt.*
2. Male antennæ simple,	3.
Male antennæ pectinate.	*Ciris*, Grt.
3. Front smooth.	*Eudryas*, Boisd.
Front horned.	*Copidryas*, Grt.

With regard to the geographical distribution *Eudryas* occurs in North America (east and west coast), and in South America (Paraguay). *Copidryas* in North America (New Mexico, Texas) and in South America.* (? Buenos Ayres). *Euscirrhopterus* is Cuban and *Ciris* is from Texas. With regard to the species, it is not entirely impossible that Walker's type of *Eudryas Stæ. Johannis* represents a Florida species else unknown. It is pronounced by Prof. Smith to be an aberration of *E. grata*, and its divergence from the type to have been probably produced by the "vicissitudes of the voyage." The former statement may not improbably be the true solution of the matter, since so prominent an insect should have been turned up by collectors in Florida ere this, one might think. But the cause assigned for such an aberration I am unable to follow, or even to understand. What is meant by "vicissitudes of the voyage?" The pupa (?) could not have suffered shipwreck or been washed ashore! What records are there in literature of extraordinary variations being produced through ordinary transportation by sea? The chances against the

*See Papilio 3, 106. Berg's *Platensis*, as I understand his remark as to the front, probably belongs to *Copidryas*.

Digitized by Google

unprotected survival during the voyage, that this pupa should produce an unique variety, the capture of the perfect moth on a Church step in England, its delivery at the British Museum, taken altogther seem enormous. The fact that the hind-wings are unbanded is paralleled in the case of a new species from South America, which I describe here. According to Mr. Tutt's kind communication: There is a place in Southwark, one of the London districts close by London Bridge, called "Horselydown," and there is a church there called St. John's. As this is very near the river an imported insect might be found there if we suppose it to escape from the shipping on the Thames. But there is also a place called "Horsley" in Surrey, and there are some well-known "Downs" there which have been entomologically worked over from a long period. But there is no St. John's Church there, and under the theory that Walker named the insect from the Church in England, and not, as I had imagined possible, from the St. John's River, Florida, where Doubleday collected, the Surrey locality must be abandoned. We are, therefore, driven to the conclusion that if the label is genuine, the specimen was really captured at "Horselydown," and that "Horsley Downs" is a mistake for the former on the label. If a normal specimen of *Eudryas grata* had been stated to have been caught in England, while still extraordinary, there would have been nothing so very improbable in the fact, since, according to Wood and other English authors, *Drasteria*, *Eustrotia* and other American moths have been so taken (?); I myself took a specimen of a South American species of Noctuidæ on the Battery in New York. But that this particular specimen should belong also to a very remarkable variety, never observed in America, increases the chances against the story (which may nevertheless be a true one) enormously. *Eudryas*, we may concede, might stand the voyage as a pupa and also escape as a moth in London, but how a *Stæ. Johannis* could have been turned out of a *grata* caterpillar or pupa owing to the "vicissitudes of the voyage" I do not comprehend. The type which I saw in 1868 differed not only from *grata* in its unbanded secondaries, but also by its differently coloured and perhaps marked primaries. While I recognized it as allied to *grata*, I could not help supposing it a distinct species, since I had never known *grata* to vary in that manner. In fact, that it might be a variety did not, I think, occur to me. I did not visit the Museum for the express purpose of studying *Stæ. Johannis*. I took it in rapidly and saw that it was an *Eudryas* and differed from both our common species, *grata* and *unio*, and simply re-

Digitized by Google

corded the fact that it impressed me as a distinct and even larger species. It may be that we are already in possession of the final solution of this little entomological mystery, and that *Stæ. Johannis* is really an extraordinary variation of *grata*, captured on the Church door of St. John's, in Horselydown, London, England. But it will nevertheless remain an interesting subject until we find specimens in America of the aberration, which ought to occur there also, or until we send *grata* pupa across the Atlantic and observe the effects of the "vicissitudes of the voyage." If any of these latter evolve as *Stæ. Johannis*, the mystery would be solved, and an important phase in the general subject of variation opened up. But I cannot think it. The aberration, if one, must have a cause independent of the mere voyage. Moisture, temperature, might possibly darken the primaries, but how are we to account for the secondaries, which so far from being "suffused," have no band at all, the usual ground colour obtaining over the whole surface? Here is a specimen which on the fore-wings is to show the effects of melanism, and on the hind-wings of albinism. The type of *Stæ. Johannis* is, under the circumstances, one of the most extraordinary specimens, I think, in the British Museum collection, whatever view we take of the matter, and the question before the American collector now is the range of variability in *E. grata*, and whether this shows any steps in the direction of a darkening of the fore-wings and obliteration of the marginal band on secondaries. Thus, quite independent of mere controversy as to the origin of the type, the subject is eminently one for scientific enquiry and experiment.

Eudryas Cypris, n. s.

The hind-wings with the fringes are pale vermillion-red above and below, immaculate, without band or markings. Fore-wings beneath of the same red, immaculate. Above the fore-wings have the main central portion creamy, not pure white as in allies, shading inferiorly to ochrey-olivaceous, and there is an olivaceous shade patch over the median nervules edged outwardly narrowly with whitish and deepening in colour inferiorly. A brownish terminal band, best marked superiorly on costa, and showing a lilac reflection. From opposite the cell to anal angle this band is indented by the pale red terminal edge of the wing. The somewhat olivaceous fringes show a darker median line. The costal edge towards apices is faintly red. The costal and internal shading recalls *grata*, but there is less trace of the reniform than in the N. American form; in *cypris* the traces of the reniform (perhaps variable) are fragment-

Digitized by Google

ary, as in *unio*. Abdomen red on the sides; venter pale. Antennæ simple. Front not tuberculate. One female from Assumption (So. America, coll. Consul Mangels) in Mus. Bremen.

This species is perhaps a little smaller than *grata*, very different from both N. American species by the darker creamy shade, not white, of the median field of primaries, by the red colour of hind-wings and under-surface, by the red abdomen and unbanded secondaries. It is, in shape of primaries and in their style of ornamentation, nearer *grata* than *unio*. The discovery of a South American representative of *grata*, with unbanded secondaries, is interesting. The latter character is only found in *E. Stae. Johannis*, where the yellow hind-wings are without band. Although on this account alone the specific value of the latter may not be adequately defended, yet the probabilities in favour of this view may be considered to become somewhat heightened in view of the discovery of the South American species. The terminal bands of the hind-wings in *grata* and *unio* are decidedly characteristic, and one is unprepared for their absence in *Stae. Johannis*, unwilling to consider so marked a modification merely varietal.

The following is a list of the *Eudriinæ*:—**

Eudryas, Boisd.

1. unio, *Hübn.*
   var. brevipennis, *Stretch.*
2. grata, *Fabr.*
   assimilis, Boisd.
   ab? Stræ. Johannis, *Walk.*
3. Cypris, *Grt.*
   Ciris, Grt.
4. Wilsoni, *Grt.*

Copidryas, Grt.

5. Gloveri, *G. & R.*
6. platensis, *Berg.*

Euscirrhopterus, Grt.

7. Poeyi, *Grt.*
   disparilis, H.-S.

The North American *Agaristidæ* apparently fall into two sub-families, the *Eudriinæ*, above catalogued, and the *Alypiinæ*, containing *Alypia*, *Androloma*, *Pseudalypia*, *Edwardsia*, and *Psychomorpha*. The *Castniidæ* are apparently not represented in the North American fauna. The *Zygænidæ* are now restricted by Dr. Packard so as to include *Horama*, *Burtia* and allies, with *Ctenucha* and *Scepsis* in one sub-family group, while *Procris*, *Harrisina* and their allies fall into the typical sub-family, being more intimately related with the European *Zygæna*, a genus not represented with us. From this it will appear that a belief in the stability of the rearrangement of the *Zygænidæ* in the Philadelphia List will probably prove illusory. The genus *Oeta*, Grt., should be removed to the *Tineidæ*, as indicated by Zeller.

**For a list of our species consult also Papilio I., 177. I have never seen a Californian specimen, and am quite doubtful as to *brevipennis* being a variety of *unio*. Stretch's figure and description were made from an imperfect example. The Cuban *E. Poeyi* was subsequently described by Herrick-Schaeffer as *Heterandra disparilis*; on comparison of the dates of issue of the two publications, which appeared nearly at the same time, the Philadelphia paper has priority.

Digitized by Google

LIST OF COLEOPTERA TAKEN AT SPARROW LAKE, ONT.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

[In our last number, pages 272–5, the lists of Coleoptera were unfortunately disarranged in making up the forms. We accordingly reprint them in their proper order.—ED. C. E.]

Cicindela repanda, *Dej.*
var. 12-guttata, *Dej.*
Cychrus Lecontei, *Dej.*
Carabus sylvosus, *Say.*
Calosoma scrutator, *Fab.*
Wilcoxi, *Lec.*
calidum, *Fab.*
Elaphrus ruscarius, *Say.*
Loricera cærulescens, *Linn.*
Nebria pallipes, *Say.*
Scarites subterraneus, *Fab.*
Dyschirius nigripes, *Lec.*
Bembidium patruele, *Dej.*
versicolor, *Lec.*
Sp. undetermined.
Tachys nanus, *Gyll.*
flavicauda, *Say.*
Patrobus longicornis, *Say.*
Pterostichus honestus, *Say.*
coracinus, *Newm.*
stygicus, *Say.*
lucublandus, *Say.*
caudicalis, *Say.*
luctuosus, *Dej.*
corvinus, *Dej.*
erythropus, *Dej.*
Amara exarata, *Dej.*
pallipes, *Kirby.*
rubrica, *Hald.*
Calathus gregarius, *Say.*
Platynus sinuatus, *Dej.*
extensicollis, *Say.*
atratus, *Lec.*
Platynus melanarius, *Dej.*
corvus, *Lec.*
placidus, *Say.*
Bogemanni. *Gyll.*
ruficornis, *Lec.*
Galerita janus, *Fab.*
Lebia viridis, *Say.*
Metabletus americanus, *Dej.*
Cymindis pilosa, *Say.*
Brachynus cyanipennis, *Say.*
Chlænius sericeus, *Forst.*
pennsylvanicus, *Say.*
Anomoglossus emarginatus, *Say.*
Brachylobus lithophilus, *Say.*
Agonoderus pallipes, *Fab.*
Harpalus erraticus, *Say.*
viridiæneus, *Beauv.*
Sp. undetermined.
pennsylvanicus, *De G.*
fallax, *Lec.*
pleuriticus, *Kirby.*
viduus, *Lec.*
Stenolophus plebeius, *Dej.*
conjunctus, *Say.*
Anisodactylus Harrisii, *Lec.*
interstitialis, *Say.*
Ilybius biguttatus, *Germ.*
Hydaticus stagnalis, *Fab.*
Dytiscus fasciventris, *Say.*
Gyrinus canadensis, *Reg.* ?
analis, *Say.*
Berosus striatus, *Say.*
Philydrus perplexus, *Lec.*

Digitized by Google

Hydrobius fuscipes, *Linn.*
Creniphilus sub-cupreus, *Say.*
Cercyon pygmæum, *Ill.*
Necrophorus vespilloides, *Hbst.*
Silpha Americana, *Linn.*
Liodes discolor, *Mels.*
Homalota trimaculata, *Er.*
Bolitochara picta, *Fauv.*
Aleochara bimaculata, *Grav.*
graciliformis, *Fauv.*
Gyrophæna vinula, *Er.*
Quedius fulgidus, *Fab.*
lævigatus, *Gyll.*
Listotrophus cingulatus, *Grav.*
Creophilus maxillosus, *Linn.*
Staphylinus violaceus, *Grav.*
Philonthus politus, *Linn.*
longicornis, *Steph.*
micans, *Grav.*
cyanipennis, *Fab.*
sordidus, *Grav.*
Sp. undetermined.
Xantholinus obsidianus, *Mels.*
emmesus, *Grav.*
obscurus, *Er.*
N. S. (found here).
Baptolinus longiceps, *Fauv.*
Stenus—3 sp.
Lathrobium punctulatum, *Lec.*
bicolor, *Lec.*
Stilicus, sp.
Pæderus littorarius, *Grav.*
Sunius longiusculus, *Mann.*
Tachinus repandus, *Horn.*
fimbriatus, *Grav.*
Erchomus ventriculus, *Say.*
Conosoma pubescens, *Payk.*
Boletobius cincticollis, *Say.*
Olisthærus substriatus, *Gyll.*
Oxyporus femoralis, *Grav.*
rufipennis, *Lec.*
Oxytelus sculptus, *Grav.*
pennsylvanicus, *Er.*
insignitus, *Grav.*
Trogophlœus 4-punctatus, *Say.*
Scaphisoma convexum, *Say.*
Hippodamia 13-punctata, *Linn.*
Coccinella trifasciata, *Linn.*
Chilocorus bivulnerus, *Muls.*
Psyllobora 20-maculata, *Say.*
Hyperaspis signata, *Oliv.*
Scymnus lacustris, *Lec.*
Endomychus biguttatus, *Say.*
Tritoma thoracica, *Say.*
Silvanus bidentatus, *Fab.*
Læmophlæus fasciatus, *Mels.*
Hister depurator, *Say.*
sedecimstriatus, *Say.*
carolinus, *Payk.*
Lecontei, *Mars.*
Epuræa Erichsonii, *Reit.*
Sp.
Ips fasciatus, *Oliv.*
Stephostethus liratus, *Lec.*
Corticaria pusilla, *Mann.*
pumila. *Lec.*
Tenebrioides corticalis, *Mels.*
Cyphon obscurus, *Guer.*
Deltometopus amœnicornis, *Say.*
Dromaeolus Harringtoni, *Horn.*
Alaus myops, *Fab.*
Agriotes fucosus, *Lec.*
Sp.
Melanotus castanipes, *Payk.*
fissilis, *Say.*
Corymbites medianus, *Germ.*

Digitized by Google

Cormybites propola, *Lec.*
Dicerca tuberculata, *Chev.*
Sp. undetermined.
Buprestis rusticorum, *Kirby.*
fasciata, *Fab.*
Agrilus ruficollis, *Fab.*
Calopteron terminale, *Say.*
Calochromus perfaceta, *Say.*
Ellychnia corusca, *Linn.*
Telephorus lineola, *Fab.*
scitulus, *Say.*
Collops tricolor, *Say.*
Trichodes Nuttalli, *Kirby.*
Hydnocera pallipennis, *Say.*
longicollis, *Zieg.*
Cis fuscipes, *Mellie.*
Canthon lævis, *Drury.*
Onthophagus Hecate, *Panz.*
Dialytes striatulus, *Say.*
Ulkei, *Horn.*
Aphodius fossor, *Linn.*
fimetarius, *Linn.*
ruricola, *Mels.*
leopardus, *Horn.*
lentus, *Horn.*
Geotrupes splendidus, *Fab.*
Anomala lucicola, *Fab.*
Ligyrus relictus, *Say.*
Euphoria fulgida, *Fab.*
Osmoderma scabra, *Beauv.*
Trichius affinis, *Gory.*
Valgus canaliculatus, *Fab.*
Hylotrupes bajulus, *Linn.*
ligneus, *Fab.*
Calloides nobilis, *Say.*
Arhopalus fulminans, *Fab.*
Xylotrechus sagittatus, *Germ.*
Clytanthus ruricola, *Oliv.*
Euderces picipes, *Fab.*
Desmocerus palliatus, *Forst.*
Centrodera decolorata, *Harr.*
Gaurotes cyanipennis, *Say.*
Typocerus sparsus, *Lec.*
velutinus, *Oliv.*
Leptura nitens, *Forst.*
canadensis, *Oliv.*
vagans (var. brevis, *Kirby*)
Monohammus confusor, *Kirby.*
Urographis fasciatus, *De G.*
Saperda vestita, *Say.*
3-dentata, *Oliv.*
Amphionycha flammata, *Newm.*
Donacia palmata, *Oliv.*
piscatrix, *Lac.*
proxima, *Kirby.*
2 sp. not determined.
Pachybrachys femoratus, *Oliv.*
hepaticus, *Mels.*
Monachus saponatus, *Fab.*
Diachus auratus, *Fab.*
Adoxus obscurus (var. vitis, *Fab.*)
Xanthonia 10-notata, *Say.*
Typophorus canellus (var. aterrimus.)
Chrysochus auratus, *Fab.*
Rhabdopterus picipes, *Oliv.*
Doryphora 10 lineata, *Say.*
Chrysomela bigsbyana, *Kirby.*
Galerucella nymphææ, *Linn.*
Diabrotica 12-punctata, *Fab.*
" vittata, *Fab.*
Phyllobrotica decorata, *Say.*
Cerotoma 3-furcata, *Forst.*
Dysonycha pennsylvanica, *Illig.*
Haltica ignita, *Illig.*
Crepidodera helxines, *Linn.*

Digitized by Google

Epitrix cucumeris, *Harris.*
Systena hudsonias, *Forst.*
marginalis, *Illig.*
Nyctobates pennsylvanica, *De G.*
Xylopinus saperdioides, *Oliv.*
Tenebrio molitor, *Linn.*
Blapstinus interruptus, *Say.*
Uloma impressa, *Mels.*
Diaperis hydni, *Fab.*
Boletotherus bifurcus, *Fab.*
Cistela sericea, *Say.*
Penthe pimelia, *Fab.*
Eustrophus confinis, *Lec.*
Canifa pallipes, *Mels.*
Stenotrachelus arctatus, *Say.*
Anaspis rufa, *Say.*
Mordella melæna, *Germ.*
marginata, *Mels.*
Xylophilus tuberculifer, (*infra.*)
Epicauta pennsylvanica, *De G.*
Attelabus bipustulatus, *Fab.*
Ithycerus noveboracensis, *Forst.*
Lissorhoptrus simplex, *Say.*
Magdalis armicollis, *Say.*
Orchestes niger, *Horn.*
Gymnetron tetrum, *Fab.*
Balaninus uniformis, *Lec.*
Eupsalis minuta, *Drury.*
Dryocœtes, n. sp.

CORRESPONDENCE.

NOTES ON HEPIALUS.

In CAN. ENT., Vol. XXV., p. 124, Mr. Neumoegen and myself referred *Hepialus quadriguttatus* as a synonym of *H. argenteomaculatus*, and described the salmon-colored form as a new variety. To this Mr. Grote objected (CAN. ENT., XXV., 186) and also Dr. Strecker, Proc. Acad. Sci. Phila., p. 282). In view of these opinions, it seems probable that we were wrong, and I correct the synonymy below. In the same paper, Dr. Strecker describes as new *Hepialus los*. I cannot see in his description anything but a form of *argenteomaculatus*, wanting one of the basal silver spots and possessing some additional spots subapically, such as we often see in *quadriguttatus*. I have had in my collection for some years a specimen more extreme than this seems to be, for it has none of the silver spots, being otherwise normally marked. I would propose for it the name *perdita*.

Our species of Hepialus of large size, with the apices of primaries rectangular, may be arranged as follows, and the generic term Stenopis, Pack, may be retained for them :—

S. ARGENTEOMACULATUS, Harris.
argentatus, Packard.
alni, Kellicott.
var. purpurascens, *Packard.*

Digitized by Google

var. los, *Strecker.*
var. perdita, *Dyar.*
var. quadriguttatus, *Grote.*
semiauratus, Neumoegen and Dyar.
S. THULE, Strecker.
S. AURATUS, Grote.

Dr. Strecker objects to the reference of *quadriguttatus* as a variery of *argenteomaculatus*, and would consider it a distinct species; but I am unable to find a good specific character. I should hesitate to rely on the colour alone in this genus, and have preferred to follow Prof. Smith's "List."

HARRISON G. DYAR.

ALEXICLES ASPERSA, Grote.

As pointed out by Prof. Smith, the original description of Alexicles is entirely inadequate. In fact, no characters are given which will determine its family position, the author going as far as to partially retract his own opinion as to its location. I have before me the type, very kindly forwarded to me for examination by Mr. W. A. Snow. It is a true Arctian apparently most nearly allied to Leptarctia. Head moderately prominent, tongue imperceptible; median spurs of hind tibiæ wanting; anterior tibiæ armed at tip with a stout, slightly curved spine or claw. ♂ frenulum a long spine, hooked into a loop on subcostal vein of primaries. Venation arctiiform; one internal vein on primaries, two on secondaries; median veins four-branched, normal; cells closed; vein 8 of secondaries from the subcostal more than one-third the length of cell from base. On primaries no accessory cell; veins 7–10 stalked; 8 and 9 forming a short furcation near apex of wing; 7 nearer the furcation and 10 rather near the cell, leaving a long stalk between their origins; vein 11 from the subcostal near end of cell; vein 12 from the base half way between the subcostal vein and costa.

Fore-wings narrow, costa straight, apex rounded; hind-wings oval.

It is scarcely necessary to add anything to Mr. Grote's description of the species. Though short, it is excellent, as are nearly all of Mr. Grote's specific descriptions. Mr. Grote gives the expanse as 32 mm.; but in the type, mounted as usual, the wings reach 36 mm.

HARRISON G. DYAR.

DR. HAGEN.

We deeply regret the loss of our old friend, Dr. Hermann August Hagen, Professor of Entomology in Harvard University, who died, after a long illness, at Cambridge, Mass., on the 9th of November, in the seventy-seventh year of his age.

Digitized by Google

INDEX TO VOLUME XXV.

Aaron, E. M , article by, 258.
Acalles Curtus, n sp., 308.
Acalyptrate Muscidæ, larval food habits of, 10.
Acorutes longispinus, n sp., 315.
Acutalis apicalis, n. sp., 53.
" *trifurcata*, n. sp , 53.
Adelura tibialis, n. sp., 79.
Adoneta spinuloides, 302.
Adoxus obscurus, 278.
African butterflies, new species of, 1. .
Agassiz Association, 188.
Agnomonia anilis, 156.
" erasa, 156.
" obsoleta, 156.
" quadrifilaris, 156.
Agrotids taken at trap lanterns, 82.
Aldrich, J. M., article by. 25
Aleochara graciliformis, 276.
Alexicles aspersa, 328.
Alfalfa, lepidopterous larvæ on, 229.
Alucita Elliottii, n. sp., 95.
" *Eupatorii*, n sp., 96.
" *Fishii*, n. sp., 95.
Amalopota Fitchi, n. sp., 280
Ammalo helops, 112.
Anisopogon, synopsis of asilid genus, 20.
" *ludius*, n. sp., 20.
" *patruelis*, n. sp., 21.
" *rubidus*, n. sp., 21.
Anoura magna, n. sp., 128.
Anurida maritimia, 314.
Aphelenchus olesistus, 269.
Aphodius leopardus, 277.
Aphoromma, n. gen., 314.
Aphorura, n. gen., 313.
Aphoruridæ, table of genera, 313.
Archilithobius Bruneri, n sp., 162.
" *dorsospinorum*, n. sp., 162.
" *Malterris*, n. sp., 161.
" *Nebrascensis*, n. sp., 161.
Argynnis amphilocus, 186.
" Astarte, 186.
" Egleis, 259.
" Victoria, 186.
Artaxa ingenita, 121.
Ashmead, W. H., article by, 67.
Astatus bicolor, 27, 44.
" pygidialis, 27, 44.
Aterica fuliginosa, n. sp., 2.
Athysanus extrusus, n. sp., 283.
" *instabilis*, n. sp., 284.
" table of species, 285.
Automeris Io., var. *Argus*, n. var., 123.

Balaninus confusor, n. sp., 309.
Banks, N., articles by, 27, 64, 205, 252.
Baptolinus? longiceps, 276.
Bean. T. E., article by, 145.
Bembidium postfasciatum. n. sp., 305.
Bethune, C J. S., articles by, 260, 261, 295.
Blacodes, synopsis of asilid genus, 33.
" *clausus*, n. sp., 34.
" *cristatus* n. sp. 33.
" *truncus*, n. sp., 34.
Blapstinus auripilis, 35.
Blatchley, W. S., article by, 89.
Blennocampa atrata, n. sp., 239.
" *populifoliella*, n. sp., 304.
Blissus leucopterus, 35.
Bolbonota bispinifera, n. sp., 55.
Bolitochara picta, 276.
Bombycids, unidentified, 125, 164, 188, 211, 301.
Book notices, 27, 86, 235, 295.
Bourletia, n. gen., 313.
Brachysius, n. gen., 317,
" *dilatatus*, n. sp , 317.
Bracon lixi, n. sp., 67.
" *rufomarginatus*, n. sp., 68.
Braconids, descriptions of new, 67.
Butterflies, new African, 1.
Butterflies of Grand Rapids, Mich., 98.
" " Laggan, 145.
" " North America, Edwards, 86.
Butterflies, Scudder's Brief Guide to, 235.
Butterfly larvæ not hitherto described, 93.
" Notes on a Polymorphic, 286.

Cænophanes anthaxiæ, n. sp., 77.
" *hylotrupidis*, n. sp., 78.
" *languriæ*, n. sp., 77.
" *pityophthori*, n. sp., 78.
" table of species, 74.
Calandra oryzæ, 36.
Caligo Teucer, 311.
Callidryas Eubule, 296,

Digitized by Google

Can the Diptera be considered the highest insects, 7, 25, 135.
Carterocephalus mandan, 145, 257.
" palæmon, 145, 257.
Catocaline moths from Georgia, 153.
Certila flexuosa. 303.
Chætosticha pretiosa, 256.
Chalcid parasite, 256.
Chelanops grossus, n. sp , 65.
" *latus*, n. sp., 64.
" *pallipes*, n. sp., 64.
Chernetidæ, new from the U. States, 64.
Chionobas subhyalina, 137.
Chlænius Pennsylvanicus, 275.
Chlorotettix necopina, n. sp.. 282.
Chrysomela exclamationis, description of grubs, 168.
Chrysophanus dione, larva and chrysalis of, 22.
Chthonius spinosus, n. sp., 67.
Cicadula Slossoni, n. sp., 281.
Cisthene lactea, 301.
Clerus formicarius, 267.
Clisiocampa, additions to genus, 4.
" *ambisimilis*, n. sp., 40.
" Americana, taken at trap-lanterns, 81.
" *Azteca*, n. sp., 5.
" fragilis, 112.
" larvæ of. 37.
" *mus*, n. sp.. 4.
" " var. *discolorata*, n. var. 4.
" *pluvialis*, n. sp., 42.
Clover-leaf weevil in Italy, 255.
Cockerell, T. D. H., articles by, 26, 112, 181, 221, 294.
Cœlinius Hopkinsii, n. sp , 77.
Coleocentrus Canadensis, n. sp., 29.
" *Pettitii*, n. sp., 30.
" table of species, 30.
Coleoptera affecting forest trees, 201.
" hints on collecting in winter, 97.
" new arrangement of, 9.
" occurring near Allegheny, Pa., descriptions of, 305.
" taken at Sparrow Lake, 272, 324,
Colias Behrii, 158.
" Philodice, 104.
" " var. *luteitincta*, n. var., 104.
Conocephalus palustris, n. sp., 89.
Copimamestra, note on, 184.
Coquillett, D W., articles by, 20, 33, 80, 118, 175, 197, 222, 260.
Coriscium cuculipenellum, 96.
Cornell Insectary, notes from, 81.
Corrections 25, 56, 260, 296.
Corymbites elongaticollis, n sp., 307.
Cotton wood leaf miner, 304
Cræsus latitarsus, 246.
Crambus albilineellus, n. sp., 94.
" *Coloradellus*, n. sp., 95.
Creophilus maxillosus, 276.
Crocota rosa, female of, 25.
Crossidius, some interesting colour varieties in genus, 189.
Cucullia, revision of genus, 45.
Cycnia dubia, suggestion as to the identity of, 180.
Cynipids, two new, from Washington State, 110.

Dalcerides, n. gen., 121.
Dasychira clandestina, 303.
Davis, W. T., article by, 108.
Dialytes Ulkei, 278.
Diastrophus Kincaidii, n. sp., 110.
Dioctria parvulus, n. sp., 80.
" *rulidus*, n sp., 80.
" Synopsis of asilid genus, 80.
Diptera from San Domingo, 170
Dolerus borealis, n. sp., 238.
" sericeus, 238.
Dryocœtes affaber ? 279.
Dyar, H. G., articles by, 27, 28, 37, 93, 121, 158, 180, 185, 188, 195, 220, 244, 256, 301, 327, 328.
Dyaria, n. gen., 213.
" *singularis*, n. sp., 215.
Dysonycha Pennsylvanica, 279.

Ecthrus Provancheri, 32, 57.
" *rufopedibus*, n. sp., 31.
" table of species, 31.
Economic Entomologists, fifth annual meeting of, 263.
Edwards, W. H., articles by, 137, 253. 286.
Efferia, n. gen., 175.
" *candida*, n. sp., 176.
" *pernicis*, n. sp., 175.
" *rava*, n. sp., 176.
Ehrmann, G. A., article by, 257.
Elwes, W. J., article by, 186.
Emphytus multicolor, 59.
Entomological Society of Ontario, annual meeting of 293.
Erax, new asilid genus related to, 175.
Erebus odora, 310.
Euchophyllum Rileyi, n. sp., 56.

Digitized by Google

Eucoptocnemis fimbriaris, 216.
" var. *sordida*, n. var., 217.
" the species of, 216.
Eudriinæ, on the, 319.
Eudryas Cypris, n, sp., 322.
" grata, 320.
" Stæ. Johannis, 320.
" unio, 321.
Eulepidotis, note on, 184.
Eumelia Danbyi, 25.
Euphœdra imitans, n. sp , 3.
Eurosta bicelovicæ, n. sp., 49.
Eurybunus, n. gen,. 209.
" *brunneus*, n. sp., 209.
Euryphene castanea, n. sp., 1.
" *suffumigata*, n. sp., 2.
Exochilum mundum attacking fall web-worm, 312.
Experimental Farms, report of, 295.

Felt, E. P., article by, 129.
Feltia jaculifera, 82.
" subgothica, 82.
Fenusa varipes, 59, 247.
Fernald, C. H , article by, 94.
Field notes from Texas and Louisiana, 139.
Field, W. L. W., article by, 88.
Fitch's types of N. American Membracidæ, 171, 196,
Fletcher J., articles by, 86, 163, 235.
Ford, A., article by, 97.
Forest trees, insects affecting, 201.
Fox, W. J , articles by, 44, 113.
French, G. H., article by, 25.
Fyles, T. W., articles by, 23, 107, 109.

Gastropacha, a new, 144.
Gibb, L.. articles by, 88, 177.
Gillette, C. P , article by, 110.
Globipes, n. gen., 208.
" *spinulatus*, n. sp., 208.
Gluphisia clandestina, 303.
" septentrionalis, 303.
" trilineata. 303.
Gnathocephalus, n. gen., 318.
" *complexus*, n. sp , 318.
Goding, F. W., articles by, 53, 171, 196.
Gorytes dentatus, n. sp., 116.
Grammodes concolor, n sp , 155.
" consobrina, 154.
" similis, 155.
" Smithii, 154.
Grote, A. R., articles by, 45, 56, 153, 184, 186, 211, 216, 319.

Hagen, Dr. H. A., death of, 328.
Halisidota macularia, 27.
" megapyrrha, 27.
Hamilton, J., articles by, 272, 305, 324.
Harpiphorus tarsatus, 59.
Harrington, W. H., articles by, 29, 57.
Hart, C. A., article by, 27.
Helcon occidentalis, 78.
Heliophobus fimbriaris, 216.
Hemichroa Americana, 244.
Hemiptychus castaneus, n sp., 307.
Hepialus argenteomaculatus, 124, 186, 300, 327.
" auratus, 260, 327.
" los, 327.
" McGlasbani, 300.
" mustelinus, 299.
" *perdita*, n var., 327.
" quadriguttatus, 125, 186, 327.
" *roseicaput*, n. sp., 125.
" thule, occurrence of, at Montreal, 297.
" velleda, 299.
Histoire Naturelle des Araignees : Simon, 27.
Holland, W. J., articles by, 1, 310.
Homolophus, n. gen., 208.
" *arcticus*, n. sp., 208.
Homoptera, new N. American, 280.
Honey-bee or house-fly, 7, 25, 135.
Hoplocampa pallipes, n. sp., 239.
Howard, L. O., article by, 263.
Hudson, G H., article by, 24.
Hyblæa puera, 294.
Hymenoptera, Canadian. 29, 57.
" new species of fossorial, 113.
Hyperchiria Io., var. *Argus*, n. var., 123.
Hyphantria cunea, 312.
Hypoprepia miniata, var. *subornata*, n. var., 124.
" table of species, 124.
Hypopta Theodori, n. sp., 220.

Ichthyura apicalis, 303.
" table of species, 122, 303.
" vau, 159, 185, 303.
Ideoroncus obscurus, n. sp., 66.
Isomira ruficollis, n. sp., 308.

Jack, J. G., article by, 183.
Japyx Americanus, n. sp., 174, 219.
" Saussurii, 219.
" subterraneus, 173, 219.

Kenyan, F. C., article by, 161.
Kirkland, A H., article by. 312.

Digitized by Google

Labida opimus, var. *bigemina*, n. var., 195.
Lachnosterna taken at trap lanterns, 83.
Lac-insect, new, from Jamaica 181.
Larvæ, preservation of, for study, 265.
Larvophagous caterpillars, 88.
Leaf-miner of cotton-wood, 292.
Lecanium Fletcheri, n. sp., 221.
Lembert, J. B., article by, 259.
Lepidoptera, additions to list of Canadian, 149.
Lepidoptera, descriptions of new forms, 121.
" Heterocera, Synonymic Catalogue of, Kirby, 28.
Lepidopterous larvæ, descriptions of, 37, 93, 109, 133, 158, 185, 229, 248, 288, 292, 294.
Leptobunus, n. gen., 209.
" *Californicus*, n. sp., 210.
Leptura Canadensis, 278.
" vagans, 278.
Leucania pseudargyria, 109.
Limacodes ferrigera, 302.
Limenitis Arthemis, 312.
" Ursula, 311.
" Weidemeyeri, 312.
Liobunum bimaculatum, n. sp., 210.
Liparid genus, description of a new, 213.
Lithobius sexdentatus, n. sp , 162.
Lithophane oriunda, 186.
Locustidæ, some new, from Indiana, 89.
Loricera cærulescens, 275.
Lubbockia cærulea, 318.
Luminous worms, 88.
Lyda Olympia, n sp., 243.
Lyman, H. H., articles by, 248, 297.
Lysitermus Scolyticida, n. sp., 74.

Macgillivray, A. D., articles by, 127, 173, 218, 237, 296, 313.
Macrophya albilabris, n. sp., 60, Californica, 240.
" *magnifica*, n. sp., 240.
" *Oregona*, 240,
Mallophora Megachile, n. sp., 118.
" Synopsis of the asilid genus, 118.
Melalopha alethe, n. sp., 122.
Melanchroia cephise, 26.
Melia Danbyi, 25.
Membracidæ of N. America, 171, 196.
" " St. Vincent Island, 53.
Messa atra, n. sp., 238.
Microlepidoptera, new N. American, 94.
Mimesa maculipes, n. sp., 117.
Moffat, J. A., articles by, 149, 186, 234, 258.
Monophadnus atracornus, n. sp., 239.
Monostegia Kincaidii, n. sp , 239.
" maculata, 59.
Myriapoda of Nebraska, 161.
Myzine thoracica, n. sp., 113.

Neanura, n. gen., 314.
Nematus castaneus, 237.
" *lineatus*, n. sp., 59
" luteolus, 238.
" *rufocinctus*, n sp., 58.
" *thoracicus*, n. sp., 58.
Nemeophila Scudderi, preparatory stages of, 248.
Neumoegen, B., articles by, 4, 6, 25, 121, 213.
Nicocles argentatus n. sp., 119.
" Synopsis of the asilid genus, 118
Noctuidæ, Catalogue of N. American: Smith, 295.
Nomophila noctuella, 129.
Notes and Queries, 310.

Ocneria dispar, 258
Œdematophorus cretidactylus, 96.
" occidentalis, 96.
Œdonia exigua, 302.
Oligolophus montanus, n. sp., 252.
Olpium obscurum, n. sp., 65.
Orchelimum Bruneri, n. sp., 92.
" *campestre*, n sp., 91.
" *Indianense*, n. sp., 90.
Oudemansia cærulea, 318.

Pachybaris strigapunctus, n. sp., 309
Pachyprotasis delta, 60.
" omega, 60.
" varipicta, 60.
Packard, A S., article by, 151.
Pamphilus cinctus, n. sp , 62.
" fascipennis, 62.
" *ruficeps*, n. sp , 62.
Papilio Bairdii, 253.
" Cresphontes, 260, 311.
" Hollandii, 253.
" Homerus, new localities for, 258.
" Notes on a polymorphic, 253.
" Oregonia, 253.
" Philenor, 311.
" " larvæ becoming larvophagous, 17.
" Turnus, black male of, 122.

Digitized by Google

Parnassius Clodius, 163.
" Smintheus, 163.
Patton, W. H., article by, 9.
Phalanginæ of the U States, 205.
Philonthus politus, 276.
Phlœotribus liminaris, 111.
Phurys flavistriaria, 157.
" perplexa, 157.
Phyciodes Carlota, 93, 99
Phyllodesma Dyari, n sp., 144.
Phytomyza affinis, 265.
Phytonomus punctatus, 255,
Piophila casei, 270.
Planiceps calcaratus, n sp., 115.
Platynus parmarginatus, n. sp , 305.
Platypteryx arcuata, 24.
" genicula, 24.
Podura granulata, n. sp., 316.
Podurhippus, 316.
Poduridæ, table of genera, 315.
Pompilus posterus, n sp., 115.
" *relativus*, n. sp , 114
Prionia, a new form of, 24.
" *lævis*, n. sp., 24.
Prionoxystus robiniæ, variety of, 257.
Protolophus, n gen., 206.
" *singularis*, n. sp , 207.
" *tuberculatus*, n. sp., 206.
Pseudachorutes subcrassus. 317.
Pseudanaphora arcanella, 301.
Pseudopsyche exigua, 301.
Psilocephala Aldrichii, n. sp., 227.
" *baccata*, n. sp., 226.
" *festina*, n. sp., 225
" *Johnsoni*, n sp., 228.
" *marcida*, n. sp., 228.
" *montivaga*, n. sp., 226.
" *morata*, n. sp., 225.
" *obscura*, n. sp , 229.
" *pavida*, n sp , 226.
" *Slossoni*, n sp , 227.
" Synopis of genus, 222.

Raphia frater, 303.
Rhysipolis biformis, n. sp., 68.
Rhyssalus pityophthori, n. sp., 69.
Rivers, J. J., article by, 144.
Roncus pacificus, n. sp., 66.

Schizocerus tristis, var. *fumipennis*, n. var., 195.
Schoturus, n. gen., 316.
Scudder's Brief Guide to Butterflies, 235.
Sesiiadæ, notes on collecting in England, 177.
Sitotroga cerealella, 36.
Skinner, H., articles by, 22, 257.
Slosson, Mrs., articles by, 152, 260,
Smith, J. B., article by, 164.
Smynthurus floridanus, n. sp., 127.
" *spinatus*, n. sp., 127.
Song of Thyreonotus, 108.
Soronia substriata, n. sp., 306.
Spathius brachyurus, n. sp., 73.
" *claripennis*, n sp., 72.
" *pallidus*, n. sp., 74.
" *simillimus*, n. sp., 73.
" table of species, 70.
" *unifasciatus*, n. sp., 72.
Sphinx caterpillars, rearing, 234.
Sphongophorus albofasciata, n sp., 54.
" *vexillifera*, n. sp., 53.
Spilosoma virginica, 180.
Stenelophus humidus n. sp., 306.
Sthenopis argenteomaculatus, var. *semiauratus*, n. var., 124.
Strecker, H., article by, 163.
Strongylogaster pacificus, n. sp., 241.
" *primativus*, n. sp., 241.
" soriculatus, 61.
Synchloe adjutrix, 286.
" crocale, 286.
" lacinia, 286.
Synergus Garryana, n. sp., 110.
Systena marginalis. 279.

Tachardia gemmifera, n. sp., 181.
Tachinidæ, comments on Mr. Van der Wulp's diagnoses of new Mexican species, 165.
Taxonus dubitatus, 184.
" nigrisoma, 183.
Tenthredinidæ, descriptions of larvæ, 244.
" from Washington, 237.
" from Yo Semite, Cal., 195.
Tenthredo Barnstonii, 242.
" basillaris, 61.
" grandis 61.
" nigricostata, 242.
" xanthus, 242.
Tenthredopsis annulicornis, n. sp., 61.
" Evansii, 61.
" *ruficorna* n. sp, 242.
" *transversa*, n. sp., 242.
Tetracanthella pilosa, 316.
Texas, notes on injurious insects of, 35.
Thecla grunus, 94.
Thereva duplicis, n. sp., 199.
" *Johnsoni*, n. sp., 200.

Digitized by Google

Thereva nigra, 222
" *novella*, n sp., 200
" *otiosa*, n sp., 199.
" *semitaria*, n sp , 198.
" Synopsis of the dipterous genus, 197.
Theletia extranea, 301.
Thia extranea, 301.
Thyreonotus pachymerus, 108.
Thysanura. North American, 127, 173, 218, 313
Tolype, description of a new, 6.
" *tolteca*, n sp , 6.
Townsend, C. H. T , articles by, 7, 10, 48, 135, 165, 168, 201, 229, 292, 304.
Trap-lantern experiment, results of, 81.
Tremex columba, 64.
Triæna mirabilis, 318.
Trypetid bred from galls on Bigelovia, 48, 112.
Tryphon flavifrons, n sp . 107.
Tullbergyia antarctica, 314.

Unidentified Bombycids, 125 164, 188, 211, 301.
Urocerus indecisus, n. sp., 243.
" *riparius*, n. sp., 244.
Uroceridæ from Washington, 237.

Van Duzee E. P. article by, 280.
Van Winkle, A. S . articles by 212, 296.
Varina ornata. systematic position of. 151.

Webster F M . articles by 35 111, 255.
Westwood, the late Professor, 261.
Which side of the tree does Phlœotribus liminaris attack ? 111.
Wickham H. F.. articles by, 139 189.
Williston S. W. articles by. 170.
Winter collecting of coleoptera, 97.
Wolcott, R H . article by, 98

Xenylla maritima 317.
Xilophilus tuberculifer. n. sp., 279.
Xiphydria Canadensis, 63.
" rufiventris. 63,
Xyela minor, 62.

Zaræa Americana, notes on, 23.

ERRATA.

Page 6. 3d line, for *P. tolteca* read *7. tolteca*.

Page 161. 20th line, for "Archilithabius" read "Archilithobius."

Digitized by Google

THE CANADIAN

ENTOMOLOGIST.

VOLUME XXVI.

EDITED BY THE

Rev. C. J. S. Bethune, M. A., D. C. L.,

PORT HOPE, ONTARIO.

ASSISTED BY

J. Fletcher, Ottawa; H. H. Lyman, Montreal, and Rev. T. W. Fyles, South Quebec.

London, Ont.:

LONDON PRINTING AND LITHOGRAPHING CO.

1894.

Digitized by Google

Digitized by Google

LIST OF CONTRIBUTORS TO THIS VOLUME.

ASHMEAD, W. H..... WASHINGTON, D. C.
BAKER, C. F..... FORT COLLINS, COLORADO.
BANKS, N ..... SEA CLIFF, N. Y.
BEAN, T. E ..... LAGGAN, ALBERTA.
BETHUNE, REV. C. J. S. (The Editor)... PORT HOPE
BLATCHLEY, W. S..... TERRE HAUTE, INDIANA.
BUCKELL, F. I..... LONDON, ENGLAND.
CALVERT, P. P..... PHILADELPHIA, PA.
COCKERELL, T. D. A ..... LAS CRUCES, NEW MEXICO.
COQUILLETT, D. W..... LOS ANGELES, CAL.
DAVIS, G. C ..... AGRICULTURAL COLLEGE, MICH.
DYAR, HARRISON G ..... NEW YORK.
EDWARDS, J..... COLESBORNE, ENGLAND.
EDWARDS, W. H..... COALBURGH, WEST VA.
EHRMANN, G. A..... PITTSBURG, PA.
ELLIS, CARLYLE..... TORONTO.
ELWES, H. J..... COLESBORNE, ENGLAND.
FELT, E. P..... FORT PLAIN, N. Y.
FERNALD, PROF. C. H..... AMHERST, MASS.
FIELD, J. A..... MILTON, MASS.
FLETCHER, JAMES..... OTTAWA.
FOX, W. J..... PHILADELPHIA, PA.
FRENCH, PROF. G. H..... CARBONDALE, ILL.
FYLES, REV. T. W..... SOUTH QUEBEC.
GILLETTE, C. P..... FORT COLLINS, COLORADO.
GROTE, A. R ..... BREMEN, GERMANY.
GUIGNARD, J. A ..... OTTAWA.
HAMILTON, DR. JOHN..... ALLEGHENY, PA.
HANHAM, A. W..... WINNIPEG.
HARRINGTON, W. HAGUE..... OTTAWA.
HEATH, E. F..... CARTWRIGHT, MANITOBA.
HOLLAND, REV. W. J..... PITTSBURG, PA.
HOPKINS, A D..... MORGANTOWN, WEST VA.
HOWARD, L. O..... WASHINGTON, D. C.
JORDAN, MISS A. M..... NAPA, CALIFORNIA.
KELLICOTT, PROF. D. S..... COLUMBUS, OHIO.
KILMAN, A. H..... RIDGEWAY.
LEE, G. L. ..... CLEVELAND, OHIO.
LEMBERT, J. B..... YO SEMITE, CAL.
LONNBERG, DR. E..... UPSALA, SWEDEN.
LYMAN, H. H..... MONTREAL.
MACGILLIVRAY, A. D..... ITHACA, N. Y.

Digitized by Google

MARLATT, C. L. ..... WASHINGTON, D. C.
MOFFAT, J. A. ..... LONDON, ONT.
NEUMOEGEN, B. ..... NEW YORK.
OSBORN, PROF. HERBERT. ..... AMES, IOWA.
PATTON, W. HAMPTON. ..... HARTFORD, CONN.
PROUT, L. B ..... LONDON, ENGLAND.
SCUDDER, S. H. ..... CAMBRIDGE, MASS.
SHERATON, W. ..... TORONTO.
SNYDER, W. E. ..... BEAVER DAM, WISCONSIN.
STEWART, G. M. ..... TORONTO.
STRECKER, DR. H ..... READING, PA.
STROMBERG, C. W. ..... GALESBURG, ILL.
TOWNSEND, C. H. TYLER ..... LAS CRUCES, NEW MEXICO.
TUTT, J. W. ..... LONDON, ENGLAND.
VAN DUZEE, E. P. ..... BUFFALO, N. Y.
WARNER, MISS H. H. ..... LEXINGTON, KENTUCKY.
WEBSTER, PROF. F. M. ..... WOOSTER, OHIO.
WICKHAM, H. F. ..... IOWA CITY, IOWA.
WILLISTON, PROF. S. W. ..... LAWRENCE, KANSAS.

Digitized by Google

Digitized by Google

REV. C. J. S. BETHUNE.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, JANUARY, 1894. No. 1.

OUR QUARTER CENTENARY.

How swift the flight of time appears—
As t'were but yesterday
The fourth part of an hundred years
Has winged its course away!

Through all these years our folded page
Has monthly shown its face;
So many moons of science sage
Succeeding in the race!

The story that we had to tell
Of bee and butterfly,
Our story—have we told it well,
With love and earnestly?

O, with the lapse of years, how small
Do all our quarrels seem!
Like children's play, or like the fall
Of shadows on a stream!

This story of the spider's nest,
Of beetles, black or gray,
Is but a story, at the best,
Told by ephemera!

Still is it the *pursuit* of truth
Where all the pleasure lies,
A perfect knowledge—*that*, in sooth
Is hidden from our eyes.

Upon this quest our little barque
Has bravely held its way,
On board a crew of men of mark
As e'er sailed for Cathay;

And all our volumes, as they lie,
Came ever opportune,
Thanks to the patient industry
Of Saunders and Bethune!

January, 1894 A. R. GROTE.

Digitized by Google

1894.

With the December number, the CANADIAN ENTOMOLOGIST completed its twenty-fifth volume. The Council of the Entomological Society of Ontario have endeavored to make it as useful as possible to the working entomologists of North America. The publications of our Society consist chiefly of the ANNUAL REPORT published by the Hon. Minister of Agriculture and Arts of Ontario, in his annual report to the Legislature, and the monthly magazine, the CANADIAN ENTOMOLOGIST. The former of these is devoted particularly to papers of economic interest, and is distributed not only to our own members, but to every member of the Fruit Growers' Association of Ontario, to members of Parliament, the Mechanics' Institutes, etc., making an issue of about 6,000 copies. The CANADIAN ENTOMOLOGIST is published periodically, so as to give an opportunity to authors to describe new species and to record observations of scientific interest. In starting a new volume, the Editor and Council desire to thank their many eminent and sympathetic contributors for their valuable assistance in the past, and trust that by careful attention to their wishes and prompt publication of their articles they will be able not only to keep up the standard of excellence and popularity to which the magazine has attained, but to show every entomologist on the continent that the CANADIAN ENTOMOLOGIST is indispensable, if he wishes to keep in touch with what is going on in connection with his studies. The Council presents herewith, as a frontispiece to the new volume, a likeness of the Rev. C. J. S. Bethune, who for so many years and so acceptably has edited this magazine. They feel sure that contributors and readers who have not had the pleasure of meeting Dr. Bethune will be as much pleased to receive his likeness as a New Year's card from the Council, as we know those will be who have made his personal acquaintance and experienced his genial courtesy as editor.

W. H. HARRINGTON,
President of the Entomological Society of Ontario.

Digitized by Google

DESCRIPTION OF THE PREPARATORY STAGES OF PHYCIODES CARLOTA, REAKIRT (CHARIDRYAS ISMERIA, SCUDDER).

BY WM. H. EDWARDS, COALBURGH, WEST VA.

EGG.—Pear-shaped, broad at base and rounded, tapering rapidly to a small, slightly depressed, truncated summit; marked by about twenty-four low, vertical, not sharply defined ribs, which extend a little more than half way from the top to base, but vary in individuals; below the ribs to base thickly covered with shallow and irregular (both as to size and shape) indentations, not separated by definite ridges or threads; colour, when laid, pale green. Duration of this stage, nine days.

YOUNG LARVA.—Length, at one day from the egg, .08 m.; cylindrical, even, each segment rounded, with black hairs or processes rising from concolored minute tubercles, arranged as in *Tharos* and *Nycteis;* colour green with a tint of brown; head scarcely broader than 2; obovoid, bilobed, black-brown, with many short and curved black hairs over the face. Duration of this stage, between two and three days.

After first moult: length, at one day, .12-inch; each segment rounded; colour variable, either dark-brown altogether, or light yellow-brown with a darker sub-dorsal stripe; under side, feet and legs, yellow-brown; armed with spines as in the genus, these being small, conical, shining black, with black bristles about the sides, and one larger at the top; head nearly as before. Duration of this stage, three days.

After second moult: length, at one day, .18 to .20 inch; shape as before, the spines somewhat longer in proportion; colour variable, some being wholly yellow-brown, some light-brown (not so yellow), and both these types sometimes have a dark-brown sub-dorsal stripe; some are all dull green, and some are pale black, a little mottled with gray; the spines are black and rise from small shining black tubercles; head as before. To next stage, from two to three days.

After third moult: length, at one day, .3 inch; same shape; the lower lateral spines brown-yellow, the upper rows black, and in shape as before; colour variable, some being light yellow-brown, with a dark sub-dorsal stripe, some brown-black, with a patch or red-fulvous on dorsum of 2; others have a mid-dorsal row of such patches, one to each segment; others are reddish-brown; in all the lower half of the side is different from the upper part, being either greenish-brown, mottled more or less with whitish, or light brown and so mottled, but without green; head as before.

Digitized by Google

About two-thirds of the larvæ in July, and all in August and September, went into lethargy immediately after third moult, shrinking to the length of .24 and even to .2-inch, and becoming wider in the middle; the rows of spines were brought close together, with no visible interspaces. But a few of the larvæ in July went on to fourth moult and pupation. With these the duration of the stage was about three days.

After fourth moult: length, .5 inch; of three larvæ, all were black, with red-fulvous dorsal band. Probably in a large number the colours would be quite as variable as after third moult.

MATURE LARVA.—Length, .8 inch. Colour (of three examples under view), deep black, specked with white or yellow-white; a red-fulvous mid-dorsal band from 2 to 13, sometimes widening on 2, interrupted by the tubercles after 4; along the lower half of side the black ground is much mottled with white, so as to have the effect of a white band, and on either edge is a macular white line, most complete on the upper; the spines, as in the genus, rising from shining black tubercles, and are concolored with them, tapering to a blunt point, out of which springs a straight short bristle, and there are many such about the sides from top to base; under side gray-brown; the feet black, pro-legs gray-brown; head obovoid, bi-lobed, shining black, with many short curved-down black hairs from black tubercles. From fourth moult to pupation about six days.

CHRYSALIS.—Length, .54 inch; shape of *Tharos*, and resembling that species at all points; head case narrow, excavated at the sides, nearly square at top, a very little depressed; mesonotum rather prominent, not carinated, the summit rounded, the sides a little incurved; followed by a shallow depression; the abdominal segments somewhat raised anteriorly and compressed into a low and narrow transverse ridge, which reaches from one sub-dorsal tubercle to its fellow, but on 6 and 7 extends one tubercle farther; in all, the five upper rows of tubercles of the larva are here reproduced, low, conical, buff; general colour white, with pale black markings, specks, and abbreviated lines, so that the effect is gray, or pepper and salt, over the entire dorsal area and the abdomen; but the wing cases have a tint of brown; across these last an extra discal, sinuous row of seven clear white dots; the antennal cases blackish, with many dull white cross bars. Duration of this stage, eight days.

Considering what a common species CARLOTA is over at least one-third of the territory of the United States, it is remarkable that so little has been published respecting it. M. Scudder, Butt. N. E., p. 1811, says:

Digitized by Google

"This butterfly (*Ismeria*) is found over a wide extent of territory, being known south of lat. 40° from the Atlantic to the Rocky Mountains, and at the higher levels of the west, even into the heart of Colorado, and as far north as Montana, and, according to Geddes, at Brandon, Manitoba. Little is known of its history, or how many broods there are, or how it passes the winter . . . . It awaits a biographer." French, Butt., p. 175, gives as its habitat, "Southern and Western States, Rocky Mountains, Montana to Arizona, occasionly in West Virginia." Mr. T. L. Mead, Wheeler Report, 1875, p. 763, says: "Not uncommon at the lower levels and at Denver. Females much worn were taken early in June, so it is probable that the species appears about the first of May, though somewhat later in the mountains."

Mr. Bruce writes:—"*Carlota* is common in every part of Colorado that I have visited, and in the eastern part of the State is particularly abundant up to about 8,000 feet altitude. At and near Denver it flies early in May and again in midsummer. There are also a few individuals in September, a partial brood. In July, it may be seen near the foothills and in neglected clearings on flowers, the many species of Erigeron being the favourites. The disks of these flowers will be hidden by the many *Carlota* and with them *P. Camillus*. It collects in immense swarms in certain damp places, such as where a stream has overflowed and left the ground in that condition. Larvæ of all sizes can be found almost all summer in great numbers upon the leaves of the foodplants. I have sometimes seen hundreds of them running along the railway track in search of food, having eaten every leaf from the patch of sunflowers where the eggs had been deposited, at the edge of the prairies and along the various canons and gulches." But Mr. H. W. Nash, at Pueblo, writes me he has rarely seen this species there.

I have never seen this butterfly on the wing but once, and that was at Coalburgh, May 3, 1878, when a fresh male was taken near my house. On 17th July, 1867, another was taken here by a visitor. Mr. A. D. Hopkins, of the West Virginia Agricultural Station, at Morgantown, writes me that on July 8th, 1890, he found *Carlota* abundant in Upshur Co., on the summit of Stone Coal Mountain, flying in the road and in damp places on the road.

The single mention in books of any of the early stages is by Mr. Dyar, CAN. ENT., XXV., p. 93, 1893, who briefly describes an adult larva found

Digitized by Google

by him in Colorado, apparently after it had changed colour for pupation; he also describes the pupa from it, but unfortunately gives no feature whatever by which a pupa could be identified or determined.

Mr. Scudder assumes that *Ismeria*, B. & L., is the same species as *Carlota*, and gives that name priority. No one would ever know it from either the description or Boisduval's plate (A. D. 1833). In Butt. N. E., the description of larva and chrysalis is translated thus: Adult larva "yellow, with blackish spines and three longitudinal stripes (of blackish); the thoracic legs and ventral surface black, the other legs yellow." The chrysalis: "ashen gray, with some paler light spots and little dorsal tubercles nearly white." This description of the larva has no application to *Carlota*, and that of the chrysalis is too indefinite for identification. The figures of both are wholly out of drawing, and of the insects so barred and striped and spotted as to be unrecognizable. I had a copy of the book, and Mr. Reakirt had access to one, but to neither of us did it occur that *Ismeria* was what was called *Carlota*. It appears that Mr. Scudder, some years after the date of Reakirt's name, saw certain unpublished drawings by Abbot, in the British Museum, among which was *Ismeria*. Boisduval credits Abbot. Now, many of Abbot's figures, especially of larvæ and pupæ, are bad as can be, and where Boisduval has copied them there is no improvement on the original. Whether it is a true copy or not, Boisduval's figures of *Ismeria* do not represent *Carlota*, and by comparing the description with the figures it is plain that it has been drawn from the plate and not from nature. It fits no American butterfly. Consequently, the name *Ismeria* has been rejected by every American lepidopterist, so far as I know, except Mr. Scudder, and the species is known as *Carlota*. It is right that any species so figured and described should have no standing.

It will be seen that the egg of *Carlota* is closely like that of *Tharos*, built on the same plan, same shape, same ribs, though they are more numerous, (about twenty-four in *Carlota* to about fifteen in *Tharos*), same thimble-like depressions below the ribs. It differs somewhat from the egg of *Nycteis*, which is taller in proportion to its breadth, and which shows the depressions for a space below the ribs, while the lower part is smooth. The young larvæ of all three species are alike in shape and armature. The adult *Carlota* is more like *Nycteis* in one respect, namely, that its pines are larger in proportion than those of *Tharos*. I discern no other

Digitized by Google

difference. In the chrysalis *Carlota* is like *Tharos*, and differs much from *Nycteis*, which is built on the plan of *Phaeton* and the true Melitæas. In habits, all three are essentially alike. I should put *Thraos* and *Batesii*, with *Camillus*, *Picta*, and other western species in one group. *Carlota* in the next, and *Nycteis* in the third, of the genus Phyciodes.

I first received larvæ of *Carlota* on the 15th of July, 1893, from Mr. Charles A. Wiley, of Miles City, Montana, about a dozen, past second and third moults, found on sunflower. On 24th, one larva pupated, on 28th another, and a third adult was put in alcohol. The rest of this lot went into hibernation immediately after third moult, gathering in clusters on a leaf, on a slight bed of spun silk.

On 10th August, I received another invoice of larvæ in younger stages from Mr. Wiley, after first and second moults. All these hibernated after third moult.

On Sept. 8th, came a cluster of about seventy-five eggs, from Mr. Gillette, at Fort Collins, Colorado, laid by a female confined on leaf of Iva Xanthifolia, 2nd Sept. Mr. Gillette informed me that at the same date full-grown larvæ were abundant on same plant and also Helianthus annuus. These eggs were laid three deep, the bottom layer in rows of nine eggs each, standing on their bases and close together; the next layer consisted of about a dozen, laid mostly on their sides, and the third layer of three or four only. These eggs hatched, Sept. 11th, or after nine days. Mrs. Peart compared these eggs with eggs of Synchloe *Lacinia*, which we had at the same time, and wrote me: "There is very little difference between the two, about the same number of ribs (24), which reach a little more than half way the length of sides, not so much as two-thirds, but variable as to length; the indentations below the ribs shallow and irregular, the meshes between the indentations not sharply defined; the same is true of the ribs also; the tops of both are very little depressed, but *Carlota* is of lesser diameter." These larvæ went on to third moult, passing each moult the same day. I noticed the habit they had when alarmed of swaying the anterior half (or more) of the body from side to side, all moving together, and just as may be seen in larvæ of Melitæa *Phaeton* and other species of that genus. Almost at once after passing the third moult, 20th September, they gathered in clusters on the side of the box or on the leaves, shrunk up

Digitized by Google

and slept. This is like the behaviour of *Nycteis*, as related by me in CAN. ENT., XI., 102, 1879, only that *Nycteis* hibernated after second moult, instead of third. In *Nycteis* (p. 104, l. c.), of 92 larvæ of the June brood, 32 or about one-third hibernated, while the rest went on to pupation. Of 11 *Carlota*, from Montana, of July brood (probably the first brood), about two-thirds hibernated; of the August brood (probably the second), all hibernated. The larvæ from Colorado, of September (the last brood of the year), all hibernated. As fresh examples were taken at Coalburgh 3rd May and 17th July, there is evidence of two broods at least.

I gave these larvæ leaves of Actinomeris squarosa, the food of *Nycteis*, and of the Aster, the food of *Thaïos*, but they refused both and fed only on sunflower.

NOTE ON COPIDRYAS PLATENSIS.

BY A. R. GROTE, A. M.

I have suggested in "Papilio" that this South American species belongs to *Copidryas*, and is congeneric with our *C. Gloveri*. Berg's original description says of the frontal structure :—"Fronte valde prominenti, supra cornu complanato depressione declivi marginata fusca ornata." This character agrees well with *Copidryas*, but not with *Eudryas*, in which latter the front is not horned.

Of the colours of *Platensis*, Berg says, the hind-wings are ochraceous with broad and even pale fuscous marginal band, and compares the ornamentation with that of *unio*. There can thus be no shadow of doubt that my *E. cypris*, with its vermilion red unbanded secondaries and related to *E. grata* rather than to *unio*, is specificially and generically distinct. Berg uses *Euthisanotia* instead of *Eudryas*. Hubner's genus has mixed contents, and so far as I can see, from what literary material I have at hand, Boisduval was justified, in 1836, in proposing a new generic title for *grata* and *unio*.

Eudryas cypris, from Paraguay, is allied very clearly to our North American *E. grata;* it is perhaps a still handsomer species from the red colour of hind-wings and under surface. The *Eudriinæ* are generally quite pretty moths, while I think the palm for beauty must lie between *Eudryas cypris* and our North Am. *Ciris Wilsoni*.

Digitized by Google

AN ENTOMOLOGICAL TRIP TO COPPER CLIFF, ONT.

BY W. HAGUE HARRINGTON, OTTAWA.

In June, 1892, in company with Mr. Fletcher, who was anxious to obtain *Erebia Discoidalis*, Kirby, I made a visit to the famous Sudbury mining region. Leaving Ottawa on the 15th, at 3.40 p.m., we arrived at Copper Cliff at 5 a.m. the following day. As the hour was so early we tried a little collecting before calling on our friend, Mr. J. D. Evans, manager of the copper and nickel mines, who had kindly invited us to stay with him. Everything was rather moist, however; and but little could be found at this early hour except a few examples of *Banchus flavescens*. After breakfast, and some entomological discussions with our host, we sallied forth again, but showers interfered materially with collecting, and we were able to do little more than gain an idea of the character of our surroundings. The district, which is situated about long. 81 W., lat. 46.30 N., is in general somewhat similar in character to the description given by Dr. Hamilton, in a recent paper, of Sparrow Lake, from which it is distant about 150 miles in a north-westerly direction, while it is about 30 miles north of the Georgian Bay. This region is much broken with small hills and hummocks of Laurentian formation, which formerly were apparently covered by heavy forests of pine and other conifers, but which have been swept by fires, and now are sparsely clothed by a second growth of shrubs and small deciduous trees which are springing up among the burnt stumps and logs; while in numerous places the bare glaciated knobs of rock are exposed. Between the hills are occasional small areas of seemingly fertile soil, but usually these low places are swampy and contain the plants common to such moist habitats. The entrance to the Copper Cliff mine faces on a somewhat level piece of ground of moderate area, which has been converted into an artificial *solfatara*, where the glare of molten slag and the fumes of burning sulphur strongly remind one of a volcanic district. In the immediate vicinity of the roasting grounds, and for a radius of several hundred yards around, especially in the direction of the prevalent winds, vegetation has been completely destroyed by the sulphuric acid, with which every shower drenches the ground. Beyond the denuded area the effects are visible for a long distance in the discoloration and bleaching of the plants, which sometimes produce not unpleasant shades of colour or variegations of foliage. Near the mine a small stream flows down through a beaver-meadow, and further up it has been dammed to supply water for the mine. The stream is fringed with alder, willow,

Digitized by Google

cornel, etc., and the meadow, which has been caused by a former beaver-dam, is covered with coarse grass and sedges, and bordered by small spruce and tamarack.

The afternoon was brighter and Mr. Evans drove us down to Sudbury (about five miles), so that we might visit with him the locality where he had captured five examples of the desired Erebia on 12th May, 1889 (*Ottawa Naturalist*, Vol. III., p. 154.) It was of course a month later, but he was almost certain that he had seen one of these butterflies flit past the Sudbury Railway Station a week before, and we had hopes that we might obtain the coveted insect. Along the road every butterfly that flitted on ahead was anxiously watched, but each proved to belong to some commoner species. We collected many fine examples of *Phyciodes Nycteis*, which was very abundant and in perfect condition. We also obtained, under the loose bark of a stump, a pupa of this species which transformed to the imago during our visit.

From Sudbury we walked across the country in the direction of the Stobie mine; the ground being, as usual, rough and largely covered with ferns and brambles, interspersed with clumps of small poplars, birches, chokecherries, etc. No trace of Erebia could be found, but smaller and less remarkable insects occurred in fair numbers, including several species of saw-flies, of which *Tenthredo semirufa* was the most abundant. Black-flies (*Simulium*) were, however, so numerous and voracious that they made collecting very difficult, while they were ably assisted by the deer-flies (*Chrysops.*) I have had opportunities of becoming acquainted with such intrusive insects from the Atlantic to the Pacific, but I think that the black-flies of Sudbury could take first place for persistence of attack. Having separated from my companions, who carried the bottle of mosquito-oil, I was finally obliged to beat a retreat to the village, where my gory visage excited the risibilities of some of the inhabitants and induced them to size me up as a "tenderfoot." One mining individual went so far as to make some personal reflections on my "everlastingly chawed up" appearance, for which he afterwards apologized by stating that he had recently suffered in the same way himself, and he offered to confirm his unintention of giving offence, by inviting me to inspect the nearest poison (not fly) dispensary, hoping probably to find out if I was prospecting, or interested in mining areas.

Returning to Copper Cliff we spent a very pleasant and profitable evening examining the fine collections made by Mr. Evans in this district,

Digitized by Google

as well as those which he had gathered at Trenton. The next morning he advised us to go up along the beaver-meadow, and this proved to be the most interesting and profitable collecting ground which we found. Along the short wood-road leading up along the brook to the meadow, *Carterocephalus Mandan* occurred abundantly and a few other butterflies were not uncommon, while coleoptera and hymenoptera were moderately plentiful. In the meadow itself we captured a number of interesting species, of which the rarest was *Nematoplus collaris*, which has not been recorded from Canada. Four examples were taken of this beetle and an equal number of *Dolichosoma foveicolle*, a species which at Ottawa has only been once taken, in a similar habitat. *Nœmia episcopalis* was common with *Anisoticta strigata*, and several examples of *Ditylus cæruleus* occurred on low plants. *Orsodacna atra* was exceedingly abundant, and variable both in size and colour, and several species of Lampyridæ were more or less common. In the sluggish stream which divided the meadow, *Donacia proxima* was as usual on lily-pads, while *D. distincta*, *D. subtilis* and *D. emarginata?* were swept from the fringing sedges and shrubs. Of hymenoptera the most conspicuous was *Trichiosoma triangulum*, upon small willows and spiræas. Some fifty or more were taken, which, with few exceptions, were males. Along the borders of the adjacent wood several fine ichneumons were taken, including males of *Coleocentrus Pettitii*, of which Mr. Fletcher subsequently obtained females (CANADIAN ENTOMOLOGIST, Vol. XXV., page 30.) A pleasant breeze tempered the heat and kept off the flies, so that we were enabled to collect most pleasantly.

The afternoon was spent upon the adjacent hillocks, among the stumps and debris of the old burnt woods, which formerly had yielded to Mr. Evans large numbers of longicorns, etc., but which were then too old to be longer tenanted by such insects. Several of the larger Pimplinæ occurred here, such as Coleocentrus, Ephialtes, Euxorides, Xylonomus and Ecthrus. Hibernated specimens of *Vanessa antiopa* and some skippers were the only butterflies observed. Willows yielded numerous examples of the pretty little weevil *Rhynchites cyanellus*, also *Orchestes ephippiatus*, *O. subhirtus*, *Lepyrus geminatus*, etc.; spiked maples in bloom furnished several elaters and some small bees and other hymenoptera, while a fine male of *Agrilus acutipennis* was captured on birch. In the evening we made, under the guidance of our host, an inspection of the extensive smelting works, and were extremely interested in the

Digitized by Google

several operations required to produce the large cakes of copper and nickel known as *matte*. The molten slag poured out on the dump-heaps lit up the country for miles around and produced a very weird effect all night. Mr. Fletcher had to leave for Ottawa by the night train, but I remained two days longer and went over the same routes and somewhat extended the area of investigation, but did not materially enlarge our list of captures. A species of Diodontus (which I have not yet been able to place with any of the described forms) was somewhat common, generally at rest on leaves of maples, but not many specimens were collected as the foliage was too damp for sweeping and the insects were too nimble to be easily taken with the fingers alone. *Oryssus Sayi* was taken upon a burnt pine tree, so that possibly it may infest this tree as well as the maple and poplar.

The last day of my stay was so wet that no collecting could be done. Mr. Evans did indeed go with me in the morning to the beaver-meadow, where we waded about through the wet grass, but the rain became so heavy that all the insects disappeared, except mosquitoes, which were exceptionally numerous and aggressive. My time was, however, not unprofitably or unpleasantly spent, as fuller opportunity was afforded for further examination of the extensive collection of beautifully prepared specimens which has been gathered by Mr. Evans, and in which are many rare and interesting species. Each evening numerous moths were taken upon the study window screen, to which they were attracted by a light arranged so as to serve for that purpose as well as for the preparation of accumulated material.

To give some idea of the insects which may be taken in two or three days at the season in question (middle of June), I append a list of the species we collected, with the hope that at no late date our esteemed friend and co-worker, Mr. Evans, will publish his promised catalogue of the large and valuable collection he has made in this little-known region. No attempt was made to collect Lepidoptera other than butterflies, or Diptera (except a few of the larger species), while Orthoptera and Neuroptera were too few in number to be worth recording :—

LEPIDOPTERA.

Papilio Turnus, Linn. Common.
Pieris Napi, Esp., winter form *Oleracea-hyemalis*, Harris. Several.
Colias Philodice, Gdt.
Argynnis Myrina, Cram. Common in beaver-meadow.

Digitized by Google

Argynnis Bellona, Fab.

Phyciodes Tharos, Dru. Common along wood-road.

Phyciodes Nycteis, Doub–Hew. Common along roads.

Grapta Progne, Cram. One specimen.

Vanessa Antiopa, Linn. Hibernated individuals.

Neonympha Eurytris, Fab.

Lycæna Pseudargiolus, Bd.-Lec.; winter form *Lucia*, Kirby. Not rare, flitting over bushes of spiked-maple in flower.

Lycæna Comyntas, Gdt.

Feniseca Tarquinius, Fab.

Chrysophanus Hypophlæas, Bdv.

Carterocephalus Mandan, Edw. Abundant in wood-roads and openings.

Pamphila Zabulon, Bd.-Lec. In open woods.

Pamphila Zabulon, Lin., aberrant ♀ *Pocahontas*, Scud.

Pamphila Peckius, Kirby. In grassy localities.

Pamphila Mystic, Edw. Along borders of woods.

Nisoniades Icelus, Lint Common along wood-road.

Nisoniades Brizo, Bd.-Lec.

Eudamus Pylades, Scud. Border of woods.

HYMENOPTERA.

TENTHREDINIDÆ—*Cimbex americana*, Leach, var. *La Portei*, St. Farg. ♂; *Trichiosoma triangulum*, Kirby; *Hylotoma McLeayi*, Leach ♀; *H. clavicornis*, Fab., ♀; *Nematus corniger*, Norton; *N. pallicornis*, Norton; *Dolerus aprilis*, Norton; *D. sericeus*, Say; *Monophadnus tibiæ*, Norton, ♂; *Monostegia maculata*, Norton; *Selandria flavipes*, Norton; *Macrophya flavicoxæ*, Norton; *M. contaminator*, Prov., ♀; *M. n. sp. (?)* ♀; *M. trisyllaba*, Norton; *M. varia*, Norton, ♂; *Pachyprotasis delta*, Prov.; *Taxonus rufipes*, Harr., ♂; *Strongylogaster apicalis*, Say, ♂ ♀; *S. soriculatus*, Prov., ♀; *S. annulosus*, Norton, ♀; *Tenthredo rufipes*, Say, ♀; *T. verticalis*, Say, ♀; *T. semirufa*, Norton, ♀; *T. signata*, Norton? ♂ (probably the ♂ of *semirufa*); *T. n. sp. (?)* ♀; *T. ruficolor*, Norton (?) ♀; *Pamphilius ocreatus*, Say, ♀.

UROCERIDÆ—*Oryssus Sayi*, Westwood, ♀.

CYNIPIDÆ—*Figites* (*Figitodes*, Ash.) *inermis*, Prov. ♂.

ICHNEUMONIDÆ—*Ichneumon malacus*, Say, ♀; *I. acerbus*, Cress., ♂; *I. subcyaneus*, Cress., ♂; *I. parvus*, Cress., ♂; *I. canadensis*, Cress., ♀; *I. nigrovariegatus*, Prov. (?); *I. terminalis*, Cress., (?); *Amblyteles stadaconensis*, Prov, ♂; *A. perluctuosus*, Prov., ♀.

Digitized by Google

Phygadeuon n. sp., ♀; *Cryptus proximus*, Cress., ♀; *C. nuncius*, Say, ♀; *C. canadensis*, Prov., ♂; *C. n. sp.*, ♀; *Pezomachus sp.* (*canadensis*, Cress., ? ♂).

Exochilum fuscipenne, Norton, ♀; *Anomalon anale*, Say, ♀; *Paniscus albotarsatus*, Prov., ♂ ♀; *Campoplex sp.*; *Casinaria n. sp.* (?), ♀; *Limneria*, 3 sp. not determined; *Banchus flavescens*, Cress, ♀; *B. canadensis*, Cress., ♂; *B. borealis*, Cress., ♀; *B. spinosus*, Cress. (?), ♀.

Mesoleptus, n. sp. (?); *Mesoleius sp.* (?); *Tryphon analis*, Cress., ♂; *T. tibialis*, Cress., ♂; *Erromenus crassus*, Cress., ♀; *E. pedalis*, Cress., ♀; *E.* (?) *n. sp.* (?); *Cteniscus, sp.*; *Exyston clavatus*, Cress., ♀; *Exochus lævis*, Cress, ♂; *Orthocentrus sp.*

Coleocentrus Pettitii, Cress., ♂ ♀; *Ephialtes sp.* (near *gigas*, Walsh); *Pimpla conquisitor*, Say, ♂ ♀; *P. tenuicornis*, Cress, ♂ ♀; *P. rufopectus*, Cress., ♀ var.; *Glypta erratica*, Cress., ♀; *Meniscus superbus*, Prov., ♀; *Phytodietus vulgaris*, Cress., ♀ var.; *Euxorides americanus*, Cress., ♂ ♀; *Xylonomus stigmapterus*, Say, ♂ ♀; *Odontomerus mellipes*, Say, ♀; *Ecthrus abdominalis*, Cress., ♀.

BRACONIDÆ.—*Bracon longicauda*, Prov.; *Rhogas parasiticus*, Norton; *Meteorus vulgaris*, Cress.; four undetermined species.

CHALCIDIDÆ.—*Eurytoma, sp.*; one Pteromalid undetermined.

PROCTOTRYPIDÆ.—*Isobrachium, sp.* (?).

CHRYSIDIDÆ.—*Omalus læviventris*, Cress.; *Elampus speculum*, Say; *Notozus viridicyaneus*, Norton; *Chrysis cærulans*, Fab.

POMPILIDÆ.—*Agenia pulchripennis*, Cress.

PEMPHREDONIDÆ.—*Cemonus inornatus*, Say; *Pemphredon concolor*, Say; *Passalæcus mandibularis*, Cress.; *Diodontus sp.*

CRABRONIDÆ.—*Rhopalum pedicellatum*, Pack.; *Crabro bellus*, Cress., 3 ♂; *C. atrifrons*, Cress. (?), ♂; *C. effossus*, Pack., ♀; *C. 6-maculatus*, Say; *C. maculipennis*, Smith, ♂; *C. sp.*, undetermined ♂.

EUMENIDÆ.—*Eumenes fraternus*, Say, ♂; *Odynerus arvensis*, Sauss., ♀ ♂; *O. leucomelas*, Sauss., ♂; *O. tigris*, Sauss., ♂; *O. albophaleratus*, Sauss., ♀; *O. debilis*, Sauss., ♂.

VESPIDÆ.—*Polistes pallipes*, St. Farg., ♀; *Vespa maculata*, Linn., ♀; *V. scelesta*, McFar., ♀.

ANDRENIDÆ.—*Prosopis basalis*, Smith, ♂; *Sphecodes dichroa*, Smith, ♀; *Halictus coriaceus*, Smith (?), ♀; *H. confusus*, Smith (?), ♀; *Andrena hilaris*, Smith (?), ♀.

Digitized by Google

APIDÆ.—*Nomada bisignata*, Say, ♀; *Osmia lignaria*, Say, ♀; *O. simillima*, Smith, ♀; *Apathus Ashtoni*, Cress., ♀; *Bombus ternarius*, Say, ♀.

COLEOPTERA.

CARABIDÆ.—*Pterostichus lucublandus*, Say; *P. patruelis*, Dej. *Bradycellus neglectus*, Lec. (?) or n. sp.

HYDROPHILIDÆ.—*Helophorus lineatus*, Say.

STAPHYLINIDÆ.—*Listotrophus cingulatus*, Grav.; *Stenus sp.*, a small specimen since lost; *Anthobium pothos*, Mann.

COCCINELLIDÆ.—*Anisosticta strigata*, Thunb.; *Nœmia episcopalis*, Kirby; *Hippodamia 5-signata*, Kirby; *H. 13-punctata*, Linn.; *Cocinella trifasciata*, Linn.; *C. transversalis*, Muls.

CRYPTOPHAGIDÆ.—*Loberus impressus*, Lec.

DERMESTIDÆ.—*Byturus unicolor*, Say.

DASCYLLIDÆ.—*Cyphon variabilis*, Thunb.

ELATERIDÆ.—*Elater pullus*, Germ.; *E. luctuosus*, Lec.; *E. nigricans*, Germ.; *E. rubricus*, Say; *E. apicatus*, Say; *Agriotes oblongicollis*, Melsh.; *Dolopius lateralis*, Esch.; *Melanotus castanipes*, Payk.; *M. sp.* (probably a small form of preceding); *Limonius æger*, Lec.; *Campylus denticornis*, Kirby; *Sericosomus incongruus*, Lec.; *Corymbites tarsalis*, Melsh.; *C. triundulatus*, Rand.; *C. æripennis*, Kirby; *C. metallicus*, Payk.; *C. n. sp.*? (one specimen.)

THROSCIDÆ.—*Throscus constrictor*, Say.

BUPRESTIDÆ.—*Dicerca divaricata*, Say; *Melanophila longipes*, Say; *Agrilus acutipennis*, Mann.; *Brachys ærosa*, Melsh.

LAMPYRIDÆ.—*Plateros modestus*, Say; *Ellychnia corrusca*, Linn.; *Podabrus diadema*, Fab.; *P. modestus*, Say; *P. piniphilus*, Esch.; *P. lateralis*, Lec.; *Silis percomis*, Say; *Telephorus fraxini*, Say (?); *T. rectus*, Melsh. (?); *T. tuberculatus*, Lec.; *Malthodes sp.*

MALACHIDÆ—*Dolichosoma foveicolle*, Kirby.

CLERIDÆ—*Hydnocera difficilis*, Lec.

LUCANIDÆ—*Platycerus depressus*, Lec.

SCARABÆIDÆ—*Aphodius hamatus*, Say.

CERAMBYCIDÆ—*Clytanthus ruricola*, Oliv.; *Achmœops proteus*, Kirby; *Leptura sexmaculata*, Linn; *L. chrysocoma*, Kirby; *L. sphæricollis*, Say; *L. mutabilis*, Newm.

CHRYSOMELIDÆ—*Donacia proxima*, Kirby; *D. distincta*, Lec.; *D. subtilis*, Kunze; *D. emarginata*, Kirby (?); *Orsodacna atra*, Ahr.;

Digitized by Google

Syneta ferruginea, Germ.; *Pachybrachys hepaticus*, Melsh.; *Diachus catarius*, Suff.; *Chrysomela Bigsbyana*, Kirby; *Gastroidea polygoni*, Linn.; *Lina lapponica*, Linn.; *Gonioctena pallida*, Linn.; *Adimonia cavicollis*, Lec.; *A. rufosanguinea*, Say; *Œdionychis quercata*, Fab. (?); *Haltica bimarginata*, Say; *H. ignita*, Ill.; *Crepidodera Helxines*, Linn.

CISTELIDÆ—*Hymenorus pilosus*, Melsh.

LAGRIIDÆ—*Arthomacra ænea*, Say.

ŒDEMERIDÆ—*Ditylus cæruleus*, Rand.

MORDELLIDÆ—*Anaspis atra*, Lec.; *A. flavipennis*, Hald.; *A. rufa*, Say.

ANTHICIDÆ—*Nematoplus collaris*, Lec.

PYROCHROIDÆ—*Schizotus cervicalis*, Newm.

RHYNCHITIDÆ—*Rhynchites cyanellus*, Lec.; *Rhynchites* (?) *sp.* (a small brownish weevil).

ATTELABIDÆ—*Attelabus rhois*, Boh.

CURCULIONIDÆ—*Lepyrus geminatus*, Say; *Pissodes affinis*, Rand.; *Hylobius confusus*, Kirby; *Erycus puncticollis*, Lec.; *Anthonomus signatus*, Say; *A. sp. nov.*? ("marked exactly like *scutellatus*, but more elongate," Dr. Hamilton); *Orchestes pallicornis*, Say; *O. niger*, Horn; *O. ephippiatus*, Say; *O. subhirtus*, Horn; *Elleschus bipunctatus*, Linn.; *Cœliodes tenuipes*, Lec.; *Ceutorhynchus decipiens*, Lec.

SCOLYTIDÆ—*Dryocœtes septentrionis*, Mann.; *Hylurgops pinifex*, Fitch.

HEMIPTERA.

HETEROPTERA.—*Eurygaster alternatus*, Say; *Perillus exaptus*, Say; *Podisus modestus*, Dallas; *Neottiglossa undata*, Kirby; *Cosmopepla carnifex*, Fab.; *Euchistus fissilis*, Uhl.; *Corizus punctiventris*, Dallas; *Cymus augustatus*, Stal., common; *Miris affinis*, Reut.; *Lygus flavonotata*, Prov. (?); *Camptobrochis grandis*, Uhl.; *Anthocoris musculus*, Say; *Aradus rectus*, Say; *Aradus* (two species unnamed); *Coriscus inscriptus*, Kirby.

HOMOPTERA.—*Pubilia concava*, Say; *Cixius stigmatus*, Say; *Stenocranus dorsalis*, Fitch; *Lephyronia quadangularis*, Say; *Bythoscopus sobrius*, Walker; *B. variabilis*, Fitch; *B. pruni*, Prov. (?); *Idiocerus alternatus*, Fitch; *Agallia novella*, Say; *Tettigonia hieroglyphicus*, Say; *Thamnotettix subcupræus*, Prov.

SUMMARY.

The species enumerated in the foregoing lists are as follows:—Lepidoptera (Butterflies) 21, Hymenoptera 125, Coleoptera 102, Hemiptera 27, making a total of 275.

Digitized by Google

SOME UNDESCRIBED STAGES OF NOCTUID LARVÆ.

BY HARRISON G. DYAR, NEW YORK.

RAPHIA FRATER, *var.* COLORADENSIS, Put.-Cr.

Mature larva.—Head rounded, partly retracted under joint 2, waxy greenish-white, ocelli black; mouth white. Body of nearly uniform width, joint 13 smaller; segmental incisures deep. Colour translucent, clear green, with many yellow piliferous dots, on joints 3 and 4 the dorsal ones tipped with red, and a central pair of these are prolonged into short, contiguous processes. On joints 5, 9 and 12 each, a transverse, curved, yellow band, reaching to the first dot above the spiracle. These bands are whitish anteriorly, those on joints 9 and 12 partly bordered in front with crimson. Feet green, the anal pair tipped with yellow and crimson. Spiracles small, black. There are 8 of the piliferous dots on each side of a segment, besides a dorsal row of non-piliferous ones.

Cocoon.—Hard and firm; composed of bits of dirt and stones spun together.

Pupa.—Cylindrical, abdomen rounded, its segments appressed; cremaster very short, but broad and thick, without hooks. Cases and central portion of abdominal segments densely and finely wrinkled. Colour, chestnut; width, 5 mm.

Food-plant.—Poplar. Larvæ from Yosemite, California.

ACRONYCTA RADCLIFFEI, Harvey.

Dr. Thaxter has described the mature larva, and noted that it mimics Datana larvæ.

Larva before last moult.—Head bilobed, shining, the tops of the lobes brown, the front and sides mottled with large blotches of pink, the back of the head white, the clypeus and an area outside of it, green; mouth and ocelli brown; width, 2.4 mm. A few hairs arise from the head. Body enlarged dorsally on joint 12, with five rows of warts on each side, one on each segment and each bearing a black hair. Cervical shield black; a broad brown dorsal stripe, containing a red line centrally and edged with yellow, covering the first two rows of warts and ending at joint 12; the rest of the body is green with a faintly indicated white stigmatal line. Spiracles small, black rimmed.

Digitized by Google

After last moult.—Head bilobed, slightly shagreened but shiny, and furnished with a few hairs; colour black, the upper third in front, reaching to the upper half at the sides and posteriorly, orange-red; width, 3.3 mm. Body enlarged a little dorsally at joint 12; cervical shield with two rows of small warts, black, as are also the anal plate and feet. Warts small, some minute, about 24 per segment, besides those on the venter of the legless segments; warts pale, bearing thin, long, whitish hairs (7 mm.) Body black, paler ventrally, a dorsal red line from joints 3 to 11; two lateral and one substigmatal pale yellow lines, the upper one reaching from joints 3 to 11, the lower two from joints 2 to 12, confluent posteriorly. The substigmatal band is broader than the others and reaches narrowly to the top of joint 13, sending a branch to the top of joint 12, to which branch the two other lateral lines barely reach. Spiracles white. As the stage advances the dorsal line fades to the colour of the others.

Food-plant.—Wild cherry (*Prunus serotina*).

Larvæ from Rhinebeck, New York.

ACRONYCTA IMPLETA, Walker.

subochrea, Grote.

Larva, about half grown.—Head subquadrate, notched on vertex, the lobes pointed anteriorly; pale whitish, with eight pale brown spots: one covering the eyes, one before apex of each lobe, and two smaller ones respectively above and below and below the other two. Body deeply incised between the segments. Feet normal. Warts arranged as in the Arctiidæ and Liparidæ; row i. on joints 5–12 in subdorsal space; row ii. subdorsal; row iii. superstigmatal; row iv. obsolete; rows v. and vi. in the subventral space. All concolorous with the markings. Colour pale translucent yellowish, with a white subdorsal line below warts ii. Warts ii. and iii. on joint 2, and ii. on joint 3, brown. Brown patches dorsally on joints 5, 6 and 9, and irregular ones on joints 11 and 12. Hairs blackish, fine, not abundant.

Food-plant.—Witch-hazel (*Hamamelis virginica*).

Larvæ from Rhinebeck, New York.

PERIDROMA INCIVIS, Guen.

Egg.—Irregularly spherical, the base flattened; vertically striated, the

Digitized by Google

striæ becoming irregular near the vertex where they meet. Colour pale yellow. Diameter about 0.5 mm. Laid in a single layer, the eggs contiguous to each other.

First stage.—Geometriform. Head round, brownish. Body semi-transparent whitish with a purple shade, and small black dots. Thoracic feet black, the abdominal ones well developed only on joints 9, 10 and 13. Later it becomes more as in the next stage in markings.

Second stage—Head semi-transparent, almost colourless but with a reddish-tinge; ocelli black, jaws brown; a brown line along the side; width, about 0.6 mm. Body green, a distinct brown stigmatal line with two more above it but less distinct. Another line in the subventral space. A few short, black setæ. Feet all concolorous with body. The larvæ walk like geometers.

Third stage.—Head shining, pale whitish with two faint brownish bands in front, divergent basally; a distinct band at side of head covering eyes, preceded by a fainter one; mouth brownish; width, 0.9 mm. Body grass-green with five dark brown lines on each side, the upper ones rather faint, the stigmatal one very distinct, the subventral one diffuse. Between these last two is a broad white band. Feet all present, but the two anterior pair of abdominal ones much smaller than the others. The larvæ still walk with a looping motion, but less decidedly than before.

Fourth stage.—Head grass-green, shining, marked as before, but the mouth whitish; width, 1.3 mm. Joint 12 slightly enlarged. Colour grass-green; a geminate, dorsal, brownish line, continuing the front lines of head; a pale, obscure, subdorsal and a superstigmatal line, each edged with brownish above; a broad dark brown stigmatal band, below which the substigmatal ridge is white. Thoracic feet semi-transparent. The spiracles on joints 2 and 12 are white. Later, a brownish-red band appears in the centre of the white band.

More rarely the head is very pale whitish-brown, marked as above. Body reddish-brown, somewhat mottled with darker brown. Markings the same, but there are six faint, narrow lines between the dorsal and substigmatal ones.

Fifth stage.—Brown form. Head very pale brownish, marked with black on the clypeus, two broad lines divergent basally and three bands at the side, connected by mottlings; eyes black, jaws brownish, antennæ

Digitized by Google

pale; width, 2 mm. Body pale brown, mottled with dark brown, more thickly along the longitudinal lines. A row of subdorsal brown spots, smaller at the extremities. Subdorsal and lateral lines faint, narrow, double, irregular. Substigmatal band broad, pinkish-brown, edged on both sides with white, extending on to the feet of joint 13. Piliferous spots small, black. Spiracles white, those on joints 2 and 12 large. Abdominal feet nearly equally developed, the larva walking normally, no longer geometriform.

Green form.—Head pale green, marked the same, but less distinctly. Body grass-green, finely mottled with white, with the faint, narrow, irregular dorsal, double subdorsal and lateral white lines and substigmatal band as above.

Sixth stage.—Head shining pale whitish-brown; antennæ and mouth paler; jaws tipped with black; ocelli black. Down the front of the head extend two broad, black bands, diverging on either side of the clypeus and ending before reaching the mouth. These are connected by mottlings with a fainter band before the eyes on each side. Behind the eye are three more bands, irregular and partly connected. An obscure white band runs from base of antennæ to meet the substigmatal line on the body. A few setæ. Width, 3 mm. Body pale brown, mottled with black and a little white on the dorsum, the latter mostly in narrow dorsal, subdorsal and traces of the other lines. A subdorsal row of black diffuse spots, more distinct on the middle segments. Substigmatal band pinkish, edged with white. Piliferous spots small, white, those on the venter black.

Food-plant.—Fed on bur-grass (*Cenchrus tribuloides*).

Larva from Lake Worth, Florida.

HADENA EVELINA, French.

Head sordid green; ocelli black; width, 2.5 mm. Body green, mottled with white; a narrow, dorsal, white line and traces of a subdorsal one in segregations of the mottlings; a distinct, but narrow stigmatal white line, passing below the spiracle on joint 12 and on to the anal foot. Spiracles black ringed. Piliferous dots not distinct. Later the colour is pale brown, sparsely mottled with black. Head brown, reticulated with dark brown. Anal plate and cervical shield dark brown, the latter edged in front with black. The mottlings give the appearance of oblique segmental shades. Piliferous dots black, narrowly surrounded by white.

Food-plants.—Lupine (Lupinus) and wild currant (Ribes).

Larvæ from Yosemite, California.

Digitized by Google

XYLOMIGES SIMPLEX, Walker.

crucialis, Harvey.

Head black, smooth, shining; labrum and bases of antennæ pale yellow; width, 2.6 mm. Body not distinctly enlarged at joint 12, but joint 13 small. Piliferous tubercles very large, shiny brownish, each with a single hair. Body sordid greenish-white, of no decided colour, slightly translucent. A dorsal and subdorsal paler white lines. A broad pale yellow stigmatal line, shaded with orange centrally, continued narrowly and indistinctly on to the anal feet. Spiracles black.

Last stage.—Head bright shining red-brown; labrum and bases of antennæ white; jaws and ocelli black; width, 4 mm. Thoracic feet pale red-brown. Body sordid, subtranslucent white. Dorsal and subdorsal lines narrow, faint, white. Stigmatal line broad, pale yellow, enclosing the black spiracles. Piliferous dots small, black, with somewhat elevated larger bases. Under a glass the body appears mottled with white.

Food-plants.—Willow (Salix) and wild currant (Ribes). The larvæ live singly in houses made of leaves lined with silk, closed except for a hole at one end.

Found at Yosemite, California.

ACONTIA ERASTROIDES, Guen.

Egg.—Conical, flat at base, with 14 longitudinal ribs, the alternate ones slightly projecting at the top, the others not reaching quite so far. Besides these are many transverse ridges, but slightly elevated. Colour uniform green; width, 0.25 mm.; height, 0.35 mm.

First larval stage.—Geometriform, with only 10 well-developed legs. Green, a transverse band around each segment brownish, somewhat elevated. Head, cervical shield and thoracic feet black.

Larvæ from Rhinebeck, New York.

CATOCALA CEROGAMA, Guen.

Ash-gray, with many longitudinal rows of black points. Two black elevations on joint 12. Venter yellowish-green, this colour separated from the dorsal gray by a subventral line of white fringe-like processes. Head gray with black markings; joint 2 spotted with black.

Food-plant.—Linden (*Tilia americana*).

Larva from Ulster Co., New York.

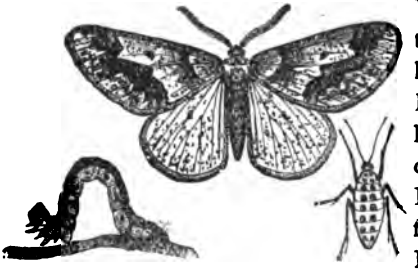
Digitized by Google

THE MOTTLED UMBER MOTH.

(*Hibernia defoliaria*, L.)

BY JAMES FLETCHER, OTTAWA.

Some years ago I received from the Rev. G. W. Taylor, of Victoria, Vancouver Island, a specimen of the Mottled Umber Moth. This had been named by the Rev. G. D. Hulst, of Brooklyn, and was, I believe, the first specimen of the species recorded as taken in America. Later, in 1889, two specimens were forwarded from the same place by Mr. W. H. Danby. Since that time, although looked for regularly at the time the males fly in autumn, none had been observed until this year, when the larvæ were so abundant that they caused considerable injuries to plum and cherry trees.



HE MOTTLED UMBER MOTH; MALE AND WINGLESS FEMALE; CATERPILLAR AFTER TASCHENBERG. (Figure kindly lent by Miss E. A. Ormerod).

The following interesting letter on the occurrence of this insect last season is from Mr. W. H. Danby:—

"Dec. 7, 1893.—*H. defoliaria* has been wonderfully plentiful this year in comparison with other seasons. During June and in the early part of July, the larvæ were a pest in most orchards and gardens, and they fed upon cherry and plum, seeming to prefer the plum. None were seen on apple. In one garden a young cherry tree, 6 feet high, had a quantity on it, and the plum trees suffered considerably from the voracity of the larvæ; but the apple trees in the same garden were not affected. I forwarded larvæ to you June 20th, and placed others in a breeding cage, being lucky enough to successfully rear several to the imago. I am glad to know that you also bred the imago. In 1889, I took 3 males in Victoria, and since then have looked for it everywhere in vain till this season, when the larvæ swarmed. The imagos began to appear about November 15th, and the electric lights proved as usual to be a great attraction. On the doorways of two hotels I collected eight dozen in one morning, and every day after that more or less were to be found on the stone walls of the aforesaid hotels. One peculiar result of the electric light drawing the male imagos from all quarters to the centre of the city was that in places where they had emerged from pupæ very few males were to be seen, while the apterous ♀ was found to be common. The sexes seem to average about 1 ♀

Digitized by Google

to 6 ♂ ♂, or say 15% are ♀ ♀. I have made enquiries and fail to find that the larva was seen on apple, whilst everyone I have interviewed on the subject noticed the cherry and plum trees being attacked; still, the larvæ may have fed on apple in places not visited by me, and as you say, 'but surely they also fed on apple,' I presume they do, and I will next year keep a look out for them and watch closely what they do feed on.

"The markings of the males vary very much; I have a series of 6 which are wonderfully unlike each other; in fact, *H. defoliaria* varies in its markings just as much as *C. Bruceata* or *E. Somniaria* do, and some are beautiful by the very reason of their wonderful contrast to the type—while one has the bands nearly black, another has apparently no median band, but is thoroughly suffused.

"The females are fond of climbing to the top of the fence rails and sunning themselves. They have very long legs, it seems to me, so much so that they have trouble in walking. Most of the imagos bred by me were females."

The caterpillars sent me by Mr. Danby were received at Ottawa on June 28th, and were full grown. They pupated in a few days, most of them on the surface of the ground, but some a short distance beneath. A few specimens were parasitized by the larvæ of a Tachinid fly. The first moth, a male, emerged on November 27th, so that the pupal stage lasted almost five months. The pupa is smooth, dark reddish-brown, nearly ¾ of an inch in length, and has the last segment terminated by a stout spine. The moth is of a dull ochre-brown hue, expanding 1¾ inches, and has the upper wings dotted and crossed diagonally by two dark waved bands; the space between these two bands is pale and bears a dark discal spot; the lower wings are paler than the upper, and like them sprinkled with brown dots and have a dark spot near the middle. The female moth is brown with two rows of conspicuous spots down the back. The wings in this sex are almost entirely aborted.

The occurrence of this insect at Victoria is worthy of note, as in England it is one of the worst orchard pests. In England, however, it is chiefly an apple pest, and it is rather strange that it has not been found on apple trees in British Columbia. Miss E. A. Ormerod says as to the food of the Mottled Umber Moth:—"The caterpillars are very abundant, and very injurious to the leafage of various kinds of fruit and forest trees, as oak, lime, etc. They have been especially noted as feeding at times on unripe cherries, gnawing away one side of the fruit." ("Manual of Injuri-

Digitized by Google

ous Insects," p. 337.) The habits of this moth are very similar to those of our canker worms (*Anisopteryx*). When the moths appear in the autumn, the females crawl up the trunks of trees and lay their eggs on the branches. In this condition the insect passes the winter.

The following description of the larvæ was taken from the British Columbian specimens sent by Mr. Danby :—

Mature Larva.—Length, 1¼ inches. Head, round, bilobed at apex, chestnut-red, mottled. Mouth parts darkened. Dorsal region reddish-brown, darkened with fine black broken lines arranged as follows: A dorsal double stripe which widens a little in the middle of each segment and is shaded with pale yellow; two narrow subdorsal lines, rather indistinct, and placed on a reddish field; a double lateral stripe, the lower line of which is distinct and sinuous. Beneath this dorsal area the stigmatal area is bright yellow. The spiracles themselves are white, ringed with black, and are in the centre of blotches of reddish-brown shaded anteriorly with black. Ventral area, including thoracic feet and prolegs, pale yellow. Some specimens are much darker than others; in the darkest there is a broken supraventral stripe just beneath the substigmatal fold, sometimes running up on to it. The prolegs on 10th segment are also sometimes darkened exteriorly.

I believe the British Columbian insect to be identical with the English, as I can find no difference between either the moths or the caterpillars.

DESCRIPTIONS OF TWO NEW HYMENOPTEROUS PARASITES FROM WATER BEETLES.

BY WILLIAM H. ASHMEAD, WASHINGTON, D. C.

I can find no record of the breeding of Hymenopterous parasites from water beetles, in either the European or American faunas, and it is, therefore, with considerable pleasure that I here describe two distinct species of Hymenopterous insects, reared from water beetles by Mr. H. F. Wickham, of Iowa City, Iowa, belonging in genera not yet reported as occurring in our fauna.

The genus *Gausocentrus* is one of Förster's new genera erected in his "Synopsis der Familien und Gattungen der Ichneumonen," 1868, p. 198, and appears a valid one, although, so far as I am aware, it still remains unrecognized by European authorities.

Digitized by Google

Cyrtogaster, Walker, is a well-known European genus well represented in our fauna, although now noticed for the first time, my collection containing not less than seven undescribed species. Kirchner records eleven described species in Europe.

SUB-FAMILY TRYPHONINÆ.

Tribe *Mesoleptini*.

Genus *Gausocentrus*, Förster.

1. *Gausocentrus gyrini*, sp. n.

♂.—Length, 3.5 to 3.8 mm. Black, shining, impunctate, clothed with a sparse, fine greyish pubescence, more apparent on face and metapleura, the apex of second abdominal segment broadly margined with red; petiole and second segment towards base subopaque, the former channeled, the latter feebly aciculated basally; petiole very long, rather slender and nearly as wide at base as at apex, about one-fourth longer than the second segment; third segment about two-thirds the length of second; fourth about half the length of third; following segments a little shorter subequal.

Head transverse, a little wider than the widest part of thorax, polished, except the face, which is feebly rugulose; clypeus subconvex, polished, truncate at apex; eyes larger, extending nearly to the base of mandibles; palpi pale or yellowish; mandibles pale rufous, bi-dentate, the teeth subequal; antennæ long, filiform, 20-jointed, reaching to base of second abdominal segment, the scape and pedicel obscure rufous, stouter than the flagellum and together not quite as long as the first flagellar joint, the flagellum black, cylindrical, of a uniform thickness throughout, finely pubescent, the joints gradually shortening toward apex.

Thorax smooth, with two well-defined parapsidal furrows; pronotum contracted, much narrower than the mesonotum; scutellum with a deep transverse depression at base, behind which it is convexly elevated; metathorax areolated above, rounded off posteriorly, with the pleura finally rugose; tegulæ and legs, including all coxæ, brownish-yellow, or pale ferruginous, the middle and hind tarsi and the posterior tibiæ above, subfuscous; tibial spurs, 1, 2, 2, not conspicuous; wings hyaline, the large stigma and venation dark brown; areolet pentagonal; second discoidal cell only about half the length of the third, the discoidal nervure very obtusely angulate a little before the middle of the third discoidal cell.

Hab.—Independence, Iowa.

Bred by Mr. H. F. Wickham, from pupa of a water beetle, *Gyrinus* sp.

Digitized by Google

FAMILY CHALCIDIDÆ.

SUB-FAMILY PTEROMALINÆ.

Tribe *Sphegigastrini.*

Genus *Cyrtogaster*, Walker.

2. *Cyrtogaster dineutis*, sp. n.

♀.—Length, 2.5 to 2.65 mm. Bronze-green, confluently punctate; sides of thorax and beneath bluish, or blue-green, with a conspicuous smooth triangular cupreous spot beneath the insertion of hind wing; metapleura with some long greyish hairs; palpi fuscous; mandibles piceous or rufo-piceous; scape, pedicel and legs, except coxæ, brownish-yellow; flagellum black or brown-black; coxæ metallic-green; wings hyaline, the nervures pale.

The head is broadly transverse, wider than the widest part of meso-thorax, or a little more than three times as wide as thick antero-posteriorly, the punctation finer on face and towards the clypeus, the latter with some fine converging striæ; antennæ 13-jointed, inserted a little below the middle of the face, the flagellum subclavate, about one and a-half times as long as the scape; pedicel long, longer than the first flagellar joint and the two ring-joints combined; flagellar joints, after the first, wider than long. Thorax with the parapsidal furrows indicated only anteriorly, the pronotum transverse, much narrower than the mesonotum, the metanotum much produced at apex, confluently punctate, with a carina above; wings hyaline, the apical two-thirds pubescent, the basal one-third bare; the marginal and post-marginal nervures are nearly equal in length, about one-third longer than the stigmal, the stigmal nervure ends in a small stigma with a slight uncus.

Abdomen short ovate, attached to the produced portion of the meta-thorax by a short but distinct petiole, the segments two and three very large, occupying most of the surface, the second with a deep emargination at base, the segments after the third very short, subequal, all united not longer than the third.

Hab.—Independence, Iowa.

Bred by Mr. H. F. Wickham from the pupa of *Dineutes assimilis*, obtained September 1, the flies issuing September 11 and 12.

This species is probably only a secondary parasite, judging from other bred species of the genus in my collection.

Digitized by Google

BOOK NOTICES.

THE BUTTERFLIES OF NORTH AMERICA: By W. H. Edwards. Third Series. Part XIII.

Another part of Mr. Edwards's magnificent work has been received, and is of particular interest to Canadian students. The three beautiful plates represent the following:—Plate I., *Neominois Ridingsii*, Edw. The upper and lower sides of both sexes of the early and late forms are shown, together with the egg and pupa, and a full series of enlarged drawings illustrating the larva in all its stages. This is a Coloradan insect, and flies in the mountains at an elevation of from 5,000 to 8,000 feet. Up to the present there is no recorded instance of *N. Ridingsii* having been taken in Canada.

Plate II. shows *Chionobas Æno*, Bdl., ♂ and ♀, and a variety of the male, as well as *Ch. Æno*, var. *Assimilis*, Butler, and the egg of *Crambis*, Freyer. *Æno* is an arctic species occurring with the variety in Labrador, and also in Colorado where it inhabits the loftiest mountain peaks. An interesting account of its habits is given from the notes of Mr. David Bruce, who has done a great deal to work up the life-histories of the butterflies of the Coloradan mountains. *Æno* belongs to the *Semidea* group of the genus, and has been confounded with that species and *Crambis*, Freyer. Mr. Edwards says:—"It was not till Mr. Bruce explored the peaks of Colorado that it became possible to understand what *Æno* was, and the limitation of *Brucei* made clear the position of *Crambis*."

The series is now arranged as follows:—

1. CRAMBIS, Freyer.
2. BRUCEI, Edw.
3. ÆNO, Bdl.
   ——— var. ASSIMILIS, Butler.
4. SEMIDEA.
5. SUBHYALINA.

Ch. Also, Bdl., Mr. Edwards rejects altogether as an American species.

Plate III. shows *Ch. Macounii*, the grand species which was discovered at Nepigon, north of Lake Superior, by Prof. John Macoun, of the Geological Survey, in whose honour it was named. *Ch. Macounii* belongs to a different group of the genus to the species mentioned above, and finds its place with *Californica* and some other large species occurring on the Pacific coast. It is a fine insect expanding 2–2½ inches

Digitized by Google

and has the remarkable feature of lacking the sexual band of androconia or special scales, which is such a striking characteristic of the males of all the other species in the genus. The plate is a very beautiful one, and shows a pale male and the full life-history with the exception of the pupa. The female figured, although of course copied from an actual specimen, is hardly typical of that sex, and it is to be hoped that at some future time Mr. Edwards will publish another illustration showing the more usual form, which has a much richer appearance both on the upper and under sides.

Ch. Macounii is decidedly a variable species, both in the intensity of the golden brown of the wings, in the amount of infuscation along the nervures, and in the size and number of the ocelli. Both sexes frequently have three ocelli on the primaries, and occasionally four. One specimen in my collection, plainly a male, has four distinct ocelli on the primaries, the second and fourth from the apex large and pupilled. In fact, this specimen has more nearly the markings of what appears to me the typical form of the females. There is also a very much infuscated variation of the male which is rarely taken, in which the nervures are all broadly bordered and the greater part of the surface of the disk is covered with dark scales. One of these was mentioned by Mr. Edwards in his original description (CAN. ENT., XVII., p. 74), and was omitted from the plate now published for want of space. The life-history of this species has not yet been fully worked out, as no one has succeeded in obtaining the pupa. It will probably be much like that of *Ch. Chryxus;* but for the present it is unknown, and it remains for some expert and patient breeder to carry the larvæ through all their stages and obtain this missing link. The eggs are easily obtained when a female has been captured; but the breeding is very tedious, the larval life lasting nearly two years.

JAMES FLETCHER.

MONOGRAPH OF THE NORTH AMERICAN PROCTOTRYPIDÆ, by William H. Ashmead. Bulletin of the U. S. National Museum, No. 45; pages 472; plates 18.

Every student of the Hymenoptera must be delighted at the issue of this magnificent volume, which bears most ample testimony to the extensive studies and patient industry of the author. Treating, as he does, of a family in which the American species had previously been but meagrely represented in collections, he has necessarily been compelled to describe

Digitized by Google

a large proportion of the insects now recognized, and to erect a considerable number of genera for their reception. The labour involved in the critical examinations requisite for the determination and description of so many microscopic forms, and in the preparation of the voluminous text, must have been enormous, yet the author has been able to amplify and embellish his work by the delineation of some one hundred and fifty exquisite figures.

The position of the Proctotrypidæ in the order Hymenoptera is considered to be much more closely allied to some families of the Aculeata than to the Chalcididæ, with which they have been usually grouped, while they also approach in other respects the parasitic Cynipidæ. The Mymarinæ, hitherto included as a sub-family, are set aside as constituting a distinct family allied to the Chalcididæ, so that the species now contained in the Proctotrypidæ are characterized, and distinguished from the Chalcids, by the pronotum extending back to the tegulæ, and the ovipositor issuing from the tip of the abdomen. Ten sub-families are recognized, which contain about one hundred and thirty genera, represented by nearly six hundred species—a doubling of the genera and quadrupling of the species as enumerated in the catalogue of Hymenoptera issued a few years ago by Mr. Cresson. Many of the genera are known only by single species, but others contain numerous forms, the most extensive being Polygnotus (32), Proctotrypes (21), Prosacantha (27) and Telenomus (32). The synoptic tables requisite for the separation of the species in such genera, as well as the tables for the distinction of genera, etc., give evidence of great care and skill in their preparation and arrangement.

While many of the genera are apparently confined to the more southerly and westerly regions, the species in other groups have an extended range, which at times seems to be almost continental, as for instance *Proctotrypes californicus*, which has been taken at Ottawa The members of this family have received but scanty attention in Canada, so that their distribution northward cannot be stated, but undoubtedly many interesting species could be found by a careful and patient collector in any locality. Provancher, in his Faune Entomologique, was able only to announce the occurrence of *nine* species, and about twice as many are recorded in his Additions completed just before his death. Mr. Ashmead, however, has been able to enlarge the list of Canadian species to about ninety. With the exception of three forms from Vancouver Island, the

Digitized by Google

species are all from a few localities in Eastern Ontario and Quebec, so that the Dominion as a whole has been practically unworked. The three western species are *Mesitius vancouverensis* and *Polymecus vancouverensis*, collected by the Rev. G. W. Taylor, of Victoria (and communicated through the writer to Mr. Ashmead), and *Anteon puncticeps*, taken by Mr. Wickham.

Although the Proctotrypids are all small, and frequently microscopic, they show great variations in structure, and their study thus becomes very interesting. A large proportion of them are egg-parasites, while others prey upon Aphididæ, Cecidomyidæ, etc. In many species (noticeably in the sub-family Bethylinæ) the females differ largely from the males in the shape of the head, antennæ and structure generally. Those of the sub-family Dryininæ have remarkable chelate, or pincer-like claws, on the anterior feet, which are probably for more firmly grasping, during oviposition, the small, active homopterous insects on which the larvæ are parasitic. Many forms are wingless or have very rudimentary wings, but they are, nevertheless, very nimble little atoms, and can leap many times their own length.

As the appearance of Mr. Ashmead's splendid monograph may stimulate some of our members to the collection and study of these insects, it may be stated that a considerable number of the species, such as Bæus, etc., may be obtained even in winter by sifting moss as is done for small coleoptera. This habit of hibernating in the moss of swampy localities is another feature (not mentioned by the author) which separates them from the other hymenoptera known to me, with the exception, perhaps, of ants, which are also occasionally obtained in sifting. W. H. H.

CORRESPONDENCE.

SYNCHLOE LACINIA, ABERR. RUFESCENS.

I had intended to withdraw this name, lest the form to which it refers might be one of those already named as a species; but now that it has been published by Mr. Edwards (Vol. XXV., p. 287), it will be useful to define its precise application. The original specimen was described by me as follows:—Bands ochre strongly suffused with orange above and below; bands on upper side of hind-wings broad, orange, reaching to the row of white spots; outer row of spots on both wings unusually large; band on upper side of fore-wings practically continuous. Size, rather small. Juarez (not Juarey), Mexico, Aug. 26.

T. D. A. COCKERELL,
Las Cruces, New Mexico, Nov. 13th, 1893.

Mailed January 15th.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, FEBRUARY, 1894. No. 2.

A CHECK LIST OF THE NEARCTIC COCCIDÆ.

BY T. D. A. COCKERELL, LAS CRUCES, N. MEX.

It is ten years since Prof. Comstock published his list of North American Coccidæ*, and as the work done since that time is scattered through very various publications, it seems opportune to present a check list, from which the student can learn precisely what species are now credited to our fauna.

All forms from America north of Mexico are included herein, but a few Mexican species which perhaps belong rather to the nearctic than neotropical region, are excluded. Species known to have been introduced and which have no claim to belong to the North American fauna, are placed within square brackets [ ]. Synonyms are in italics.

ICERYA, Sign.

[1. I. purchasi, *Maskell*, 1878.]

2. I. rosæ, *Riley & Howd.*, 1890.

CEROCOCCUS, Comst.

3. C. quercus, *Comst.*, 1882.

GOSSYPARIA, Sign.

[4. G. ulmi, *Geoff.*]

ERIOCOCCUS, Targ.

[5. E. azaleæ, *Comst.*, 1881.]

[6. E. araucariæ, *Mask.*, 1878.]

7. E. quercus, *Comst.*, 1881.

DACTYLOPIUS, Costa.

?[8. D. adonidum, *Linn.*, 1767.]

9. D. citri, *Boisd.*

phyllococcus, Ashm., 1879.

destructor, Comst., 1881.

[10. D. longifilis, *Comst.*, 1881.]

11. D. crawii, *Coquill.*, 1889.

12. D. ryani, *Coquill.*, 1889.

?[13. D. iceryoides, *Mask.*, 1891.]

BERGROTHIA, Kraatz.

14. B. townsendi, *Ckll.*

PHENACOCCUS, Ckll.

15. P. yuccæ, *Coquill*, 1890.

16. P. helianthi, Ckll.

17. P. aceris, *Geoff.*, 1762.

COCCUS, Linn.

18. C. cacti, *Linn.*

19. C. confusus, *Ckll. MS.*

20. C. sorghiellus, *Forbes.*

21. C. trifolii, *Forbes.*

KERMES, "Linn."

22. K. galliformis, *Riley*; 1881.

TACHARDIA, Sign.

23. T. larreæ, *Comst.*, 1882.

ORTHEZIA, Bosc.

24. O. americana, *Walker.*

25. O. occidentalis, *Dougl.*, 1891.

* 2nd Rept. Dept. Entom., Cornell Univ. Exper. Station (1883).

Digitized by Google

26. O. annæ, *Ckll.*
27. O. edwardsii, *Ashm.*, 1888.
[28. O. insignis, *Dougl.*, 1887.]

PROSOPOPHARA, Dougl.

29. P. rufescens, *Ckll.*, 1893.

ASTEROLECANIUM, Targ.

[30. A. quercicola, *Bouché.*]
31. A. pustulans, *Ckll.*, 1892.

LECANIODIASPIS, Targ.

32. L. yuccæ, *Riley MS.*

POLLINIA, Targ.

[33. P. pollini, *Costa.*
costæ, Targ, 1869.]

PULVINARIA, Targ.

34. P. innumerabilis, *Rathv.*, 1854.
acericorticis, Fitch., 1860.
acericola, W. & R., 1868.
35. P. macluræ, *Kenn. MS.*, *Fitch.* 1855.
maclurœ, W. & R., 1868.
?[36. P. vitis, *Linn.*]
37. P. salicis, "*Bouché*," *Sign.*, 1873.
38. P. bigeloviæ, *Ckll.*
[39. P. camellicola, *Sign.*, 1873.]

LECANIUM, Illig.

40. L. hesperidum, *Linn.*
?[41. L. depressum, *Targ.*]
42. L. armeniacum, *Craw.*
43. L. pruinosum, *Comst. MS.*, *Coq.*, 1891.
44. L. platycerii, *Pack.*, 1870.
45. L. quercitronis, *Fitch.*
46. L. quercifex, *Fitch.*
47. L. fletcheri, *Ckll.*, 1893.
48. L. quercus, "*Linn.*", *Sign.*
49. L. ribis, *Fitch*, 1856.
50. L. tulipiferæ, *Cook*, 1878.
? *tiliæ*, Fitch, nec Linn.
[51. L. pyri, *Schrank.*]
52. L. robiniarum, *Dougl.*, 1890.
robiniæ, Riley MS.
[53. L. persicæ, *Fabr.*, 1798.]
54. L. juglandifex, *Fitch*, 1856.
55. L. fitchii, *Sign.*, 1873.
56. L. cynosbati, *Fitch*, 1856.
57. L. corylifex, *Fitch*, 1856.
58. L. cerasifex, *Fitch*, 1856.
59. L. caryæ, *Fitch*, 1856.
60. L. antennatum, *Sign.*, 1873.
61. L. hemisphæricum, *Targ.*
62. L. hibernaculorum, *Boisdv.*, 1868.
63. L. filicum, *Boisdv.*, 1868.
64. L. oleæ, *Bern.*

CEROPLASTES, Gray.

65. C. cirripediformis, *Comst.*, 1881.
66. C. artemisiæ, *Riley MS. (nec Rossi).*
67. C. irregularis, *Ckll.*
68. C. floridensis, *Comst.*, 1881.
?[69. C. rusci, *Linn.*]

CTENOCHITON, Mask.

?[70. C. perforatus, *Mask.*, 1879.]

ASPIDIOTUS, Bouché.

[71. A. nerii, *Bouché*, 1833.]
72. A. uvæ, *Comst.*, 1881.
var. coloratus, *Ckll.*
73. A. perniciosus, *Comst.*, 1881.
74. A. ancylus, *Putnam*, 1877.
75. A. abietis, *Comst.*, 1883.
76. A abietoides, *Pettit MS.*
77. A. pini, *Comst.*, 1881.
[78. A. cyanophylli, *Sign*, 1869.]
[79. A. spinosus, *Comst.*, 1883.]
80. A. juglans-regiæ, *Comst.*, 1881.
81. A. convexus, *Comst.*, 1881.

Digitized by Google

82. A. cydoniæ, *Comst.*, 1881.
83. A. rapax, *Comst.*, 1881.
? = camelliæ, *Boisdv.*, 1868.
84. A. perseæ, *Comst.*, 1881.
85. A. tenebricosus, *Comst.*, 1881.
[86. A. ficus, *Riley MS.*, *Ashm.*, 1880.]
87. A. smilacis, *Comst.*, 1883.
88. A. obscurus, *Comst.*, 1881.
[89. A. aurantii, *Mask.*, 1878.
citri, Comst.
var. citrinus, *Coquill.*]
90. A. corticalis, *Riley MS.*
91. A. sabalis, *Comst.*, 1883.

PSEUDOPARLATORIA, Ckll.

92. P. parlatorioides, *Comst.*, 1883.

PARLATORIA, Targ.

93. P. pergandii, *Comst.*, 1881.
var. camelliæ, *Comst.*, 1883.
94. P. proteus, *Curtis*, 1843.
?[95. P. zizyphus, *Lucas*, 1853.]

FIORINIA, Targ.

[96. F. fioriniæ, *Targ.*, 1867.
camelliæ, Comst., 1881.

ISCHNASPIS, Dougl.

[97. I. filiformis, *Dougl.*, 1887.
? = longirostris, *Sign.*, 1882.]

MYTILASPIS, Targ.

98. M. citricola, *Pack.*, 1870.
? = pinnæformis, *Bouché.*
99. M. gloverii, *Pack.*, 1869.
100. M. albus, *Ckll.*, var. concolor, *Ckll.*
101. M. pomorum, *Bouché*, 1851.
? = linearis, *Modeer.*
pyrus-malus, Kenn., 1854.
juglandis, Fitch, 1856.
pomicorticis, Riley, 1873.

PINNASPIS, Ckll.

[102. P. pandani, *Comst.*, 1881.
? = buxi, *Bouché.*]

CHIONASPIS, Sign.

103. C. citri, *Comst.*, 1883.
104. C. euonymi, *Comst.*, 1881.
105. C. furfurus, *Fitch*, 1856.
cerasi, Fitch, 1856.
106. C. lintneri, *Comst.*, 1883.
107. C. salicis, *Linn.*
salicis-nigræ, Walsh, 1868.
108. C. spartinæ, *Comst.*, 1883.
109. C. nyssæ, *Comst.*, 1881.
110. C. pinifolii, *Fitch*, 1855.
111. C. quercus, *Comst.*, 1881.
112. C. ortholobis, *Comst.*, 188 .
[113. C. biclavis, *Comst.*, 1883.]

POLIASPIS, Mask.

[114. P. cycadis, *Comst.*, 1883.]

DIASPIS, Costa.

[115. D. cacti, *Comst.*, 1883.]
[116. D. carueli, *Targ.*, 1868.]
[117. D. harrisii, *Walsh*, 1860.
? = circularis, *Fitch*, 1856.
ostreæformis, Sign., (nec Curt.)]

AULACASPIS, Ckll.

118. A. rosæ, *Bouché*, 1833.
[119. A. bromeliæ, *Kerner*, 1788.]
[120. A. boisduvalii, *Sign.*, 1869.]

Fossil Species.

LEACHIA, Sign., (nec Risso.)

121. L. simplex, *Scudd.*, 1890.

NOTES.

(1.) An interesting Monophlebid, representing a new genus and species, is found on *Prosopis* at Las Cruces. It cannot be included in the

Digitized by Google

list, being at present nameless. Prof. C. H. T. Townsend has given an account of it in Bull. 7 of the New Mexico Exper. Station, and it will be described in detail and named at some future time by Prof. Riley.

The adult ♀ has a large white ovisac, and 9-jointed antennæ. The young (2nd stage) are so much like *Icerya palmeri* that I thought they might be that species; but Prof. Riley pointed out to me that the newly-hatched larvæ could be distinguished from *I. palmeri* without any difficulty, since they possess only four (instead of six) especially long terminal hairs, and these are not so long as in *palmeri*.

On July 21 I was fortunate in finding the ♂. Its body is dark dull red, antennæ and legs black. The wings are smoky with a dark costa and two white lines. There are no conspicuous caudal appendages, but two black bristles of only moderate length. Dorsum of thorax more or less shiny black.

(2.) It seems doubtful whether *Dactylopius adonidum*, as defined by Signoret, can be definitely recorded from North America.

(3.) *Dactylopius iceryoides*, *Ctenochiton perforatus*, etc., are mentioned in *Insect Life*, April, 1893, p. 281–2, as having been imported into California. I suppose, however, that they have not become established there, and so have marked them with a query in the list. The species referred to are Nos. 13, 41, 69, 70. Others mentioned in the same article are well-known to be established in America.

(4.) *Bergrothia* takes the place of *Westwoodia* (preoccupied). A second species is known to occur in North America, but it has not been named.

(5.) Nos. 14, 16, 26, 38, 67, 72 var., and 100 var. have not been published at the date of writing, but their descriptions have been sent out for publication.

(6.) *Phenacoccus* takes the place of *Pseudococcus*, Auctt., nec Westwood.

(7.) *Coccus confusus* (which probably includes all reputed *C. cacti* of the Rocky Mtn. Region) is congeneric with an insect from Mexico, which Lichtenstein identified as *Acanthococcus tomentosus* (Lam.). The larva has spines after the manner of *Capulinia sallei*; the antennæ of the adult ♀ are very degenerate, 5-jointed. Hab., Las Cruces, N. Mex., on cacti.

(8.) *C. trifolli* and *sorghiellus*.—I know these only from Prof. Garman's account in 2nd Kentucky Report. One can safely say that they

Digitized by Google

do not belong to *Coccus*, as now understood; and until they are more critically examined it will be hard to guess at their proper location.

(9.) *Orthezia insignis* has been found by Mr. R. H. Pettit in a hot-house in the State of New York.

(10.) Nos. 32, 66, 52 syn., and 90 are credited to Riley MS. The names have all been published (two by Prof. Townsend, two by Mr. Howard), but no formal descriptions have appeared.

(11.) *Pulvinaria vitis* probably occurs with us, but it requires confirmation. It is recorded by Fitch.

(12.) *P. camellicola* I have from Macon, Ga., sent by Dr. Riley.

(13.) *Lecanium armeniacum* is a Californian species; to judge from published figures, much like *depressum.*

(14.) *Lecanium pyri* is recorded by Fitch. He confused some *Pulvinaria* with it, but there is no such species as *Pulvinaria pyri*, Fitch, properly speaking. Mr. J. Fletcher has sent me a *Lecanium* on apple, from P. Edward I.: the specimen arrived squashed flat, but on careful examination I cannot see that it is other than veritable *L. pyri*, Schr. It is strongly and thickly pitted, like the form found by Signoret on apple

(15.) *Aspidiotus abietoides* will be described by Mr. Pettit. He has kindly sent me specimens.

(16.) *Aspidiotus spinosus* and one or two other species are marked as introduced, because only found on hot-house plants, although their native country is unknown.

(17.) *Aspidiotus juglans-regiæ*, from its mode of occurrence, might be suspected as a foreigner; and it is to be observed that in the same year that it was published, Colvée described an *A. juglandis* from Catalonia. Dr. J. V. Carus has most kindly transcribed for me the description of the latter, and I find it very nearly fits *julans-regiæ*,—so nearly, that the differences in the descriptions may not be essential.

(18.) *Parlatoria zizyphus* I have found on lemons exposed for sale at Las Cruces, N. Mex. The vendor told me he *thought* they came from Mexico, but was not sure.

(19.) It has seemed strange that *Ischnaspis filiformis* was not described until 1887. Dr. V. Carus has kindly transcribed for me the description of *Mytilaspis longirostris*, Sign., 1882, and on reading it, I can hardly believe it is other than *I. filiformis.*

(20.) *Leachia simplex* was described as a *Monophlebus.* Mr. Scudder

Digitized by Google

has kindly sent me a drawing of the fossil, and judging from this and the description, I would place the insect preferably in *Leachia*.

Postscript.—Leachia, Sign., may be altered to PALÆOCOCCUS, as the name is preoccupied in Mollusca. I did not make the change in the list, as I was not sure whether the Molluscan name was valid, and I hold the "once a synonym, always a synonym" doctrine to the ridiculous. However, I have just received the following from Dr. W. H. Dall, to whom I had applied for information:—"*Leachia* Leseuer, = *Loligopsis*, Lam., but *Leachia*, Risso, according to Monterosato, is valid and is the earliest name for the group to which it is applied. I should advise changing your Coccid *Leachia* under the circumstances." T. D. A. COCKERELL.

NOTES ON COLEOPTERA.

BY C. W. STROMBERG, GALESBURG, ILL.

There are still a few species of Agrilus in our fauna whose food plant is unknown. Any contribution in that direction may, therefore, be of interest. It is a genus that seems to be much neglected by collectors, owing undoubtedly to the difficulty met with in separating some of the species. There are several seemingly difficult ones, however, which are stamped with such distinct characters as to make their study exceedingly interesting. With Dr. Horn's valuable paper, "The Species of Agrilus of Boreal America," and a well-trained eye, one should be able to get along without much assistance. That does not apply to myself, for it was only after Mr. Blanchard kindly undertook to help me out that my material was properly labelled.

Agrilus masculinus, Horn, was taken during July on the common box-elder or ash-leaved maple (Negundo aceroides.) This species resembles *otiosus*, but the ♂ has "prosternum with a space in front densely covered with short erect pubescence." This patch of hair is of a yellowish colour and can be seen distinctly with an ordinary lens if the insect is held up sidewise to the light. Once seen it will always be recognized. The ♀ is not easily distinguished from *otiosus*.

A. otiosus was beaten from hickory, walnut, butternut and dogwood.

A. arcuatus, oak, elm and hazel.

A. fallax, oak, June 12.

A. obsoletoguttatus, quite common on the red and laurel oaks, June.

A. Lecontei, not rare on hackberry (Celtis occidentalis), June and July.

A. impexus occurs on the two locusts (Gleditschia triacanthus and

Digitized by Google

Robinia pseudacacia), July and Aug.

This sp. resembles *fallax*, but it has antennæ serrate from the fifth joint, while in *fallax* they are serrate from the fourth. There are other well-marked characters for separating them, which are all given in the above-mentioned paper.

Dicerca lepida, Lec., is rare here. It has been beaten from hawthorn, and also found hibernating near the trunks of large trees on the ground among the leaves. Also found it once under bark on a stump, where it had spent the winter.

Pœcilonota thureura, Say., occurs on the black willow during July and Aug., and is not common.

Cinyra gracilipes, Melsh., is quite common on the burr or moss-cup oak (Quercus macrocarpa).

Chrysobothris azurea, Lec., not common. Beaten from linden.

Cacoplia pullata, Hald., is not often seen in exchange lists. Two specimens of this species were beaten from moss-cup oak several years ago.

Zeugophora scutellaris, Suffr., is another which is not offered for exchange. This pretty species occurs on the cottonwood during July and Aug., but seems to be rare.

NOTES UPON LYCÆNA EXILIS, BOISDUVAL, WITH DESCRIPTIONS OF SOME OF ITS EARLY STAGES.

BY WM. H. EDWARDS, COALBURGH, WEST VA.

On July 24th, 1893, I received a number of pupæ of *Exilis*, made on the road, and three nearly adult larvæ (after the last moult), sent me by Mr. T. D. A. Cockerell, at Las Cruces, New Mexico, and found on flowers of Atriplex canescens, of which a plentiful supply was also sent.

Description of ADULT LARVA.—Length at rest, .26 inch; in motion, .3 inch; very like *L. Comyntas* in shape, being long, narrow, about equally rounded at the two ends, segment 2 turned forward to the plane of the underside of the body, and concealing the head; the sides at base nearly parallel, a little convex; the dorsum elevated; from 3 to 10 on dorsum is a flattened, sub-triangular tuberculous process to each segment, as in many species of the genus; colour light green, with a silvery sheen that is caused by innumerable fine, white appressed hairs; the dorsal triangles yellowish, mottled crimson, and there is a crimson mid-dorsal line; on 11 is a dorsal cross-slit, as in *Pseudargiolus* and *Comyntas*, and no doubt there is a pair of cylindrical membranes with

Digitized by Google

tentacles concealed within 12, as in the species mentioned, though I had no opportunity to see them active; head minute, obovoid, dark brown, placed on the end of a long, conical neck.

CHRYSALIS.—Length, .22 inch, breadth at mesonotum, .06, at abdomen, .09 inch; shape elliptical; the head case rounded and truncated somewhat; the mesonotum slightly prominent, rounded at tip, not carinated, the sides a little convex, followed by a slight depression; abdomen somewhat tumid; colour yellow-white, with a pink tint over the head case; surface sparsely and irregularly dotted black, with two sub-dorsal rows of larger dots of same hue from 5 to 12. One pupa from the three larvæ gave imago 14th August, but as I had omitted to note the date of pupation, I am unable in this case to give the duration of the stage. But another pupa of those formed in route gave imago 29th July, and as it had been mailed on the 22nd, I conclude the stage must endure through six or seven days.

Mr. Cockerell wrote 22nd July:—"Yesterday, walking to the Agricultural College, I found a bush with ants running in numbers over the twigs. Looking to see what they were after, I came across a larva and then another. Presently I saw that the bush was swarming with them, only they were so perfectly concealed by their colour that I should not have noticed them except for the ants. They (the larvæ) were little and big and quite exposed to view. On same bush were many Coleopterous larvæ in their cases, and flying about the bush were many of the *Exilis* butterflies." Some of the ants were sent me with a supply of the flowers, and they were tiny creatures.

In letter of 29th July:—"Yesterday I saw a female *Exilis* deposit an egg; she thrust it under a flower on the outside. I had to look very closely to find it, even after seeing it laid. The egg is circular, seen from above, flat, greenish-white."

Dr. Boisduval described *Exilis*, in 1852, from a female, which he says is the only example of the species he has seen; and speaks of it as one of the smallest Lycænæ known. The male is considerably smaller than the female, and I think may be the smallest butterfly in the world. Notwithstanding its littleness, it flourishes in southern California, Arizona, New Mexico, parts of Colorado, Texas, and has even reached Florida. Mr. Cockerell wrote me 9th December:—"*Exilis* is still in the imago here. I caught one to-day at rest on the stalk of a Solanum. Is it possible that they hibernate as butterflies? We have had plenty of frost, though no snow as yet."

Digitized by Google

ON SOME AQUATIC LARVÆ, WITH NOTICE OF THEIR PARASITES.

BY H. F. WICKHAM, IOWA CITY, IOWA.

During the past summer, while on a visit to the northern portion of this State, my attention was attracted to the presence of numerous mud cells on the lower surface of stones lying along the bands of the Wapsipinicon River. These cells, most of them empty, with one end forced off, somewhat resembled the single one with which some of our common mud-wasps start their establishment on the ceilings of little-used rooms, or on the rafters of outhouses, but very much smaller. The largest measure about 12 mm. in length and 8 mm. in breadth, while the small ones are only 5 mm. long and 2.5 mm. wide.

After considerable search I finally succeeded in obtaining a curious pupa from one of the large cells, quite different from any with which I was previously acquainted. A cursory examination showed it to possess four eyes, two on each side of the head, the components of each pair being connected by a fine black line. This character directed suspicion to the probability of its being a Gyrinid, and confirmation was furnished by finding the legs, though rather poorly defined, evidently belonging to a beetle of that family. It was finally decided to be *Dineutes assimilis*, Aubé, the common large whirligig of our country. A half day of stone-turning resulted in the finding of more pupæ and several larvæ, as well as two or three of the soft and helpless freshly-emerged beetles. A number of the inhabitants of the little cells were also found in all three stages, and proved to be a *Gyrinus*, probably *picipes*, Aubé.*

Two of the *Dineutes* pupæ were each seen to be accompanied in their cells by a little white larva of rather robust form, evidently there with intent to do great bodily injury. Bringing them home in their original cells, I was able to watch the growth of these little creatures until one transformed to a pupa, and finally disclosed a beetle, which proved to be a species of *Brachinus*, probably *janthinipennis*, Dej. However, the determination cannot be considered authoritative, because the beetle died before attaining its full colours. The larva lies in the cell of its host and extracts the juices through an opening made in one of the wing-pads; the maggot-like body is adorned, but not supported, by six very soft and short legs, which can be of little service except perhaps as "feelers" in

* Detailed descriptions of these larvæ, with figures, may be found in Vol. II., No. 4, of the Bulletin from the Nat. Hist. Lab. of the State Univ. of Iowa.

Digitized by Google

its dark abode. The mouth is filled with a blackish fluid when withdrawn from the feeding spot. If gently touched, the head and fore part of the body would be raised, as stiffly as consistent with such a soft insect, and this posture maintained for some moments.

The little animals were carefully watched and examined several times a day, until finally the larger one, having withdrawn nearly all the juices from the pupa and become swollen to an unwieldy size, changed, after a day or two of resting, into a pupa—still in the original cell which I had removed from a stone and turned upside-down for more convenient examination. The smaller one was restless and refused to finish its feeding on the original pupa, so, as it had apparently not completed its growth, I tried it with a fresh one of *Tropisternus glaber*, which was immediately accepted as a substitute. The first pupa was probably spoiled, either by mould or bacterial decomposition, hence the necessity for fresh food in this instance. As soon as the larva had completed its growth I consigned it to the alcohol bottle for study.

How the *Brachinus* gets into the cell of its host, whether brought as a young larva clinging to that of *Dineutes*, or deposited as an egg by the mother, is a mystery to me. When small it is more active than when larger grown, and with advanced age becomes gradually more helpless. In any case the complete adaptation to a parasitic habit is apparent in the whole structure—the soft, juicy body, unprotected by chitinous scutes, the weak legs, quite useless for ambulatory purposes, and the lack of strong, locomotive bristles. The appearance is almost that of some Hymenopteron, not at all resembling the strong raptorial larvæ of Adephaga in general. I cannot believe that the larvæ of all our American *Brachinus* live on *Dineutes*, but it is quite possible that they feed on the helpless pupæ of such other Adephaga as frequent the damp spots favoured as habitations by these beetles. Perhaps some of the readers of the CANADIAN ENTOMOLOGIST may be induced to investigate the matter, or to make known the results of study if the investigation be already made.

While two *Dineutes* pupæ were infested as noticed above, another of the same species was seen to be the abode of several little maggots, which soon changed to small black pupæ, loose in the cell, without spinning cocoons. From these I finally got four specimens of a small Chalcid, eleven or twelve days after I first noticed the larvæ, which, however, were nearly full grown at that time. From Mr. Ashmead, to whom I sent the little insects, I hear that they belong to the genus *Cyrtogaster*, not

Digitized by Google

previously recorded (though known) in North America. He has called it *C. dineutis*, and as Mr. Howard, in a recent paper on the biology of the Chalcididæ*, has remarked that Hymenopterous parasites of aquatic insects are excessively rare, I have thought it worth while to give a rather detailed account of the circumstances connected with breeding them.

Two unbroken cells of *Gyrinus* each contained, besides the remains of the pupa, one specimen of a little Ichneumonid belonging to the sub-family Tryphoninæ, which Mr. Ashmead has described as *Gausocentrus gyrini*. One of these was quite fresh and bright, the other had been dead long enough to break in handling. I think it extremely unlikely that the *Gausocentrus* will prove to be a hyper-parasite, but of course this can only be settled with certainty by further observations on the habits of the larva.

A specimen of the pupa of *Tropisternus glaber* was given alive to a large Carabid larva for food, but not attacked because the larva had just fed up. Two or three days later it was seen that the pupa was dead and the body infested by maggots, which aftewards produced a species of *Phora*, a Dipterous insect which Dr. Williston (who kindly furnished the generic determination) writes me is known to enter pupæ either living or dead. I have no means of ascertaining when or how the eggs were deposited on the pupa, or whether it was attacked in this way before or after death.

Besides the two Gyrinidæ already mentioned, I found under a stone, close to the margin of the river, another larva somewhat resembling them, with long abdominal filaments, only one of which was terminal. Not being able to see the mouth parts on account of the activity of the living specimens, I was unfortunately led to speak of it as probably a Gyrinid larva in the paper referred to, chiefly because of the fact that Packard and Westwood both figure larvæ of this family with large heads. The creature lived in a tin box of earth for five weeks, then moulted and died almost immediately afterward. An examination of the mouth shows it to be a Sialid larva, corresponding closely to Westwood's figures,† except that only one of the mandibles has two teeth, the other being furnished with but one, and the outer lobe of the maxilla has a process articulated to the inner angle instead of a simple production.

* Proc. U. S. National Museum, Vol. XIV.

† Modern Class. of Insects, Vol. II., p. 46.

Digitized by Google

DESCRIPTIONS OF THE LARVÆ OF CERTAIN TENTH-REDINIDÆ.

BY HARRISON G. DYAR, NEW YORK.

(Continued from Vol. XXV., page 248.)

Monostegia quercus-coccineæ, n. sp.

Eggs apparently inserted by a series of thrusts of the ovipositor parallel to the midrib of the leaf. The saw cuts under the upper epidermis are confluent, forming a long blotch over 1 mm. wide and about 20 mm. long, running close to the midrib. The larvæ feed gregariously, eating the lower epidermis and parenchyma.

First stage.—Head oval, higher than wide, mouth pointed; blackish-brown, nearly black on vertex, shining; mouth pale; width, 0.25 mm.

Second stage.—Head shining, pale brown, darker around the black ocellus, pale around mouth; jaws dark; width, 0.4 mm.

Third stage.—Head oval, yellowish testaceous, shining; a brownish shade across between the black eyes; mouth dark; width, 0.55 mm. Body thick through the thoracic segments, slightly flattened, of even width posteriorly. Thoracic feet scarcely visible from above, pale. Abdominal feet on joints 6–12, joint 13 not touching the leaf in walking, but appears to possess a rudimentary pair of feet. Body entirely shiny, sticky, translucent whitish, shading into orange-yellow at the front and sides of thorax. Alimentary canal appearing by transparency dark green.

Fourth stage.—Head orange-yellowish, transparent; eye black; antennæ projecting before, conical; width, 0.8 mm. Body as before. Alimentary canal blackish or green. Dorsal vessel and tracheæ very plainly visible, the latter white, branching into fine ramifications, connected along the stigmatal line.

Fifth stage.—As before, but the body is very slightly milky, not, however, obscuring the internal parts, which are visible. Head, 1.1 mm. in width. The dorsal vessel shows plainly, contrasting with the milky-whitish body.

Sixth stage.—Head light-yellowish, eye black; width, 1.1 mm. Body shaped as before, but whitish, *not shining*, faintly 3-annulate, the internal organs obscured. The colour shades into orange (not ocherous-orange as before) on the thorax anteriorly and laterally; the alimentary canal giving a purplish median shade, centered by the darker dorsal vessel. Upon arriving at this stage, the larvæ leave the tree and form little elliptical cells in the ground for pupation.

Digitized by Google

Food-plant.—Black oak (*Quercus coccinea*).

Imago.—Black; basal, two-thirds of the wings smoky. Head densely punctured; a polished prominence behind the ocelli; two converging ridges in front, between which the lower ocellus lies; thorax polished. End of femora, all of the tibiæ and tarsi of anterior and middle legs white, except the last tarsal joints, which are dusky. Basal two-thirds of the posterior tibiæ and bases of all the tarsal joints white, the outer third of tibiæ and tips of tarsal joints banded with dusky. Forewings hyaline along outer margin for a space limited by a line drawn from stigma to internal angle, the basal part of wing smoky-blackish; veins and stigma black. Hindwings hyaline, the basal half faintly smoky. Expanse of wings, 10 mm.; length of body, 4.5 mm.

Two ♀ ♀, Woods' Holl., Mass.

Strongylogaster pacificus, Macgillivray.

Head round, pale, sordid whitish with a faint blackish, mottled line from above each eye to the vertex; eye large, round, black; jaws dark-brown; width, about 1.5 mm. Thoracic feet large, bent outward; abdominal ones present on joints 6–12, 13; segments 6–annulate. Colour, shining, translucent green, with a white subdorsal line running the whole length, nearly joining its fellow at the extremities. Spiracles small, black, joined by the thread-like white line of the tracheæ, showing by transparency. Length, about 20 mm.

When through eating, the larva becomes reddish and bores a gallery in a piece of decayed wood, where it remains till the following spring.

Food-plant.—Common brake (*Pteris aquilina*). Larvæ common in June at Portland, Oregon.

Monostegia quercus-albæ, Norton.

Larvæ bred by me on the white oak do not agree with Norton's description. His characterization of the fly, however, seems to fit my specimens perfectly.

Eggs.—Deposited in the manner described by Norton; forming small blisters on the underside of the leaf near the tip, separated from each other, each about 1.2 mm. in diameter.

* * * * * *

Second stage.—Head oval, brown, blackish around the eye; mouth pale; width, 0.25 mm.

Third stage.—As in next stage. Width of head, 0.35 mm.

Digitized by Google

Fourth stage.—Head angularly pyriform in outline, narrowing upward, widest above the eyes; partly retracted below joint 2; smooth, shining black; width, 0.5 mm. Body very thick through the thoracic segments, more slender posteriorly, then gradually tapering. Thoracic feet covered to the dorsal view; tinged with blackish; abdominal ones present on joints 6–12, 13, the larva resting on them on the surface of the leaf. Colour slightly greenish, transparent, shining and sticky; alimentary canal plainly visible.

Fifth stage.—Not different. Head brownish-black; width, 0.7 mm.

Sixth stage.—Head shaped as before, but of a pale whitish-yellow, eye black; width, 0.7 mm. Body not shining, scarcely more than translucent, of the same yellowish colour as the head, and marked with orange on the sides of the enlarged thoracic segments. Two transverse, dorsal, watery lines on each joint 5–13, the anterior one short, the other reaching the sides. The larvæ now form a cavity in the earth, lined with a brown secretion.

Nematus coryli, Cresson.

Eggs.—Laid on the midrib in the manner of *Cræsus latitarsus*, in a central incision.

* * * * * *

Second stage.—Head black; width, 0.45 mm.

Third stage.—Head rounded, shining blackish, mouth a little paler; eye black; width, 0.65 mm. Body shining, annulate, whitish, the alimentary canal giving a distinct light-green shade. Thoracic feet largely black. A row of blackish spots along the sub-ventral ridge; a pair of black, conical, anal projections. Abdominal feet present on joints 6–11, 13. No tubercles.

Fourth stage.—Head round, shining black; width, 0.9 mm. Body shining, coarsely 4–annulate, smooth, with minute setæ seen with a lens. Colour uniformly slightly olivaceous-green; thoracic feet marked with black at base and tip. A series of large olivaceous patches ventrally on joints 6–10.

Fifth stage.—Head flat before with clypeal dents; shining black; width, 1.25 mm. Segments shining, 4–annulate, setæ with inconspicuous concolorous bases. Colour olivaceous-green, shaded with leaden-blackish subdorsally and on sub-ventral ridge. Venter blackish, with eversible glands as in the mature larva.

Sixth stage.—Head round with a row of indentations bordering

Digitized by Google

clypeus; entirely shining black; width, 1.8 mm. Abdominal feet on joints 6–11 and 13, with fine ventral eversible glands on joints 6–10, blackish and longer than the feet. Body segments coarsely 4-annulate, smooth, shining, the tubercles represented by minute dark setæ. Colour, honey-brown, the dorsal region to the spiracles shaded with plumbeous black. Thoracic feet pale, tinged with blackish. Greatly resembles the larva of *C. latitarsus;* but the colour is a watery umber-brown, the black marks leaden.

Cocoon.—Formed below the ground. Thin, paper-like, shining, black, elliptical, 8x3.5 mm.

The flies emerged the latter part of July. Found on *Corylus rostrata* at Woods' Holl., Mass., and Plattsburgh, N. Y.

FOOD PLANTS OF SOME CALIFORNIAN LEPIDOPTERA.

BY JOHN B. LEMBERT, JERSEYDALE, MARIPOSA CO., CALIFORNIA.

I have observed the egg laying of the following species of Lepidoptera in the vicinity of the Yosemite Valley, California :—

Danais archippus.—Oviposits on the tender leaves near the flower bud of *Gomphocarpus cordifolius.*

Argynnis epithore.—On the underside of the leaves of *Viola ocellata.*

Argynnis egleis (Highland variety).—On pine burrs, pine leaves, sticks and stones, on the shaded side and as far underneath as is possible for the ♀ to get.

Argynnis egleis (Lowland variety).—Anywhere on the leaves or stems of *Carex filifolia, Festuca ovina, Horkelia fusca, Potentilla gracilis, Viola canina,* etc.

Melitæa chalcedon.—In a cluster like a bunch of grapes, from two to fifteen or thirty eggs at a time on *Castilleia parviflora.*

Chrysophanus cupreus.—Under the leaves and on the side of the stalk of *Rumex pauciflorus.*

Chrysophanus arota.—On the underside of the leaf of Vaccinium.

Chrysophanus helloides.—On the seed pods or in the leaf whorls or the stems of *Oxytheca spergulina* and *Gayophytum diffusum.*

Chrysophanus editha.—On the underside of the leaf of *Horkelia fusca.*

Lycæna dædalus.—Between the petals and sepals or between the sepals and bracts of the flower of *Trifolium monandrum.*

Digitized by Google

Lycæna rusticus.—As many as four eggs in succession on the upper side of the erect leaves of *Dodecatheon meadia* var. *lancifolium.*

Anthocharis ausonides.—Mostly underneath the leaves of *Arabis* [? sp.].

Colias Behrii.—In the heart of the flower buds or tender leaves of *Vaccinium cæspitosum* and *Gentiana Newberryii.*

Parnassius smintheus.—On the side or top or hidden out of sight on the leaves of *Phlox cæspitosa, Carex filifolia, Gayophytum diffusum,* or on pine burrs, sticks and rocks.

Papilio eurymedon.—Under the leaves of *Ceanothus prosteratus.*

Pamphila sabuleti.—At or near the base of the stem of *Carex filifolia* and under the leaves of *Trifolium monandrum.*

Pyrgus cæspitalis.—In the centre of the plant, *Horkelia fusca.*

Eudamus tityrus.—On the underside of the leaves and on the stalk of *Hosackia grandiflora.*

Eudamus nevada.—Singly or two beside each other on the leaves or stem of *Trifolium monandrum.*

Lepisesia clarkiæ.—On the underside of the leaves of *Clarkia rhomboidea* and *Gayophytum diffusum.*

Hemaris cynoglossum.—On the same.

Alypia mariposa.—On *Clarkia elegans* and *Godetia Williamsonii.*

Alypia Ridingsii.—On *Clarkia rhomboidea* and *Godetia Williamsonii.*

Oncocnemis exemplaris.—On the underside and top of the leaves of *Gentiana Newberryii* and on the grasses in the shadow of the plant.

Anarta Kellogii.—On the upperside of the erect, channeled leaves of *Carex filifolia.*

Plusia californica.—On *Trifolium monandrum.*

Plusia Hochenwarthi.—Mostly underneath the leaves of *Carex filifolia, Gentiana Newberryii,* Salix, Vaccinium, *Antennaria dioica, Mimulus primulariodes, Castelleia Lemmonii* and *Pentstemon confertus.*

Heliothis dipsaceus.—On *Erythræa venusta.*

Pyrausta unifascialis.—On the stems or stalk and on the leaves. A sugar-loaf-like egg, which is laid on sideways, applied near the pointed end on *Oxytheca spergulina* and *Gayophytum diffusum.*

Digitized by Google

THE GENERA PIERIS, SCHRK., AND EUCHLOË, HB.

BY J. W. TUTT, LONDON, ENGLAND.

In the *Ent. Am.*, 1889, pp. 33–34, is a note by Mr. T. D. A. Cockerell, F. Z. S., "On the origin of the genus *Anthocharis*, Bdv., (= *Euchloë*, Hb.)," and from his remarks on p. 34, it would appear that the larva of *Pieris protodice* and that of *Anthocharis ausonides* are practically identical, Mr. Cockerell's assumption being based on a letter received from Mr. W. H. Edwards. I am not at all certain as to the characters of the American species included in *Anthocharis*, or whether the American Anthocharids are co-generic with our species placed in *Euchloë*, Hb. Kirby separates the genera and includes our common British species, *cardamines*, in *Euchloë*, the American species in *Anthocharis*. I am anxious to learn whether our species of *Euchloë* are co-generic with the American species of *Anthocharis*.

In spite of the similarity of the larva of *Pieris* to that of *Anthocharis* as mentioned by Mr. Cockerell, an unfailing (I believe) point of distinction occurs between *Pieris* and *Euchloë*, the larva of the latter having distinctly 7 subsegments to each segment, the larva of *Pieris* but 6. But a still more constant character exists in the neuration. In *Pieris*, the neuration (Fig. 2) is as follows:—

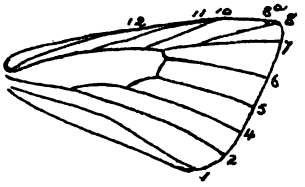


FIG. 2.

i.e.—Nervure 3 is absent, as also is 9, but 8 gives off a small branch at apex—8a. *Pieris brassicæ*, *rapæ*, *napi*, *callidice*, *daphlidice* and *bellidice* are identical in this respect.

But *Euchloë* has a different type (Fig 3). It is as follows:—

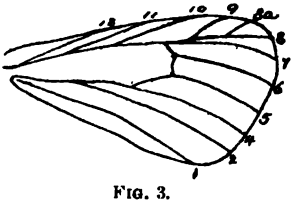


FIG. 3.

By comparing the diagrams above it will be noticed that in *Euchloë*, 7 starts on 8 much nearer the discoidal cell than in *Pieris*. 8a, is much larger in *Euchloë*, and 9 is an extra nervure in *Euchloë* not found in *Pieris*; 10 starts nearer the end of the cell in *Pieris* than *Euchloë*; whilst 6 is nearer to the base of 7 in *Pieris*.

Our *Aporia* is like *Pieris*, except that 7 starts nearly from the base of 8 (near the apex of cell), as in *Euchloë*, whilst 8a also is arranged as in *Euchloë*; 9 is absent as in *Pieris*.

Digitized by Google

Leucophasia is a modification of *Euchloë*, but owing to the atrophy of the cell which occupies only a small portion of the basal area of the wing, 10 and 11, as well as 7, 9 and 8a, all rise from 8.

I should be exceedingly obliged if any one who has a good collection of the N. American *Pieridæ* would tell me which of the *Pieridi* and *Anthocharidi* have neuration of these types.

I do not wish in any way to suggest disagreement with Mr. Cockerell's views, which may or may not be correct, but at the same time I do wish to show that the superficial larval resemblance is unreliable; and I wish also to obtain some information as to which of the American *Pieridi* and *Anthocharidi* agree generically with our British *Euchloë* and *Pieris*.

Rayleigh Villa, Westcombe Hill, Blackheath, S. E.

ADDITIONS TO THE LIST OF CANADIAN COLEOPTERA.—PART II.

BY A. H. KILMAN, RIDGEWAY, ONT.

As a supplement to my list of additions to Canadian Coleoptera published in CAN. ENT., Vol. XXI., I beg to submit the following list of species taken since 1889, in Canada, and, as far as I can learn, not recorded in any of the published lists.

In the identification of species I have been aided by Mr. Ulke and Dr. Hamilton.

(The numbers prefixed are those in Henshaw's List.)

264 Clivina rubicunda, *Lec.* Very rare, on lake shore.

296 Panagæus fasciatus, *Say.* One, on railway, May 23.

413 Bembidium cautum, *Lec.* Several, in moss, in early spring.

433 Tachys proximus, *Say.* Rare, hibernating in moss.

620 Evarthrus sodalis, *Lec.* Five, in clay, under moss, February.

712 Diplochila obtusa, *Lec.* One, under a log, May.

739 Badister flavipes, *Lec.* Rare, hibernating in moss.

820 Platynus vicinus, *G. & H.* One, on lake shore.

838 " exaratus, *Mann.* Rare, on lake shore, in the debris.

892 Lebia analis, *Dej.* One, found while beating willows at Point Abino.

1119 Harpalus testaceus, *Lec.* Rare, in pasture field, May.

1285 Cœlambus punctatus, *Say.* Several, in a pond, in low woods, May.

Digitized by Google

1426 Agabus stridulator, *Sharp.* Several, in marsh drain, at Crystal Beach, April.

1477 Hydaticus stagnalis, *Fab.* Eight, in marsh drain, April.

1545 Helophorus nitidulus, *Lec.* One, on lake shore.

1667 Cercyon nigricolle, *Say.* Not rare here, in the manure of pasture fields, June.

2114 Quedius ferox, *Lec.* Very rare, in moss, March.

2337 Stenus indigens, *Casey.* Rare, hibernating in moss.

2484 Cryptobium badium, *Grav.* Rare, on lake shore, June.

2633 Tachyporus elegans, *Horn.* Rare, on fungus, July.

3753 Cryptarcha strigata, *Fab.* One, on a stump, June.

3799 Corticaria dentigera, *Lec.* Not common, found by beating withered branches, July.

3804 Corticaria deleta, *Mann.* Not common, got while sifting moss in spring.

3872 Bactridium cavicolle, *Horn.* Very rare, a pair on maple stump, May 16.

4607 Buprestis fasciata, var. 6—plagiata. Two specimens.

4882 Podabrus basilaris, var. discoideus, *Lec.*

" " var. flavicollis, *Lec.*

" " var. punctulatus, *Lec.*

The varieties of this species are not rare here. They are found on the foliage of pine and other trees in summer.

5013 Collops vittatus, *Say.* A few specimens of a variety in which the thoracic spot is obsolete.

5594 Odontæus obesus, *Lec.* One, from Vancouver.

5771 Lachnosterna marginalis, *Lec.* Not rare.

9623 " profunda, *Bland.* Rare.

9612 " dubia, *Smith.* Common with L. fusca.

5774 " rugosa, *Mels.* Occasional.

These species were found along with thousands of specimens of fusca and other common kinds gathered on the sands of Lake Erie after a storm in June.

6550 Orsodacna atra var. tricolor, *Mels.* Rare.

6553 Zeugophora puberula, *Cr.* Rare, by sweeping low bushes on bank of creek.

6895 Trirhabda convergens, *Lec.* Nepigon. Sent me by Rev. C. J. S. Bethune ; determined by Mr. Ulke.

Digitized by Google

6944 Œdionychis 6-maculata, *Ill.*

Found this species abundant on one occasion while sweeping with a net in a weedy swamp, July 8. Could not determine what plant.

7070 Microrhopala porcata, *Mels.* One specimen taken while beating.

8677 Orchestes niger, *Horn.* Swept from weeds in June, three years in succession. Never found it prior to 1890. W. H. Harrington mentions this species among those found at Ottawa.

8956 Euchætes echidna, *Lec.* Rare, one found on elm. This specimen is in Mr. Reinecke's collection.

9213 Eusphyrus Walshii, *Lec.* Not rare, found on dead basswood.

A VERY REMARKABLE AND ANOMALOUS SYRPHID, WITH PECULIARLY DEVELOPED HIND TARSI.

BY C. H. TYLER TOWNSEND.

In a lot of flies sent me from Illinois, by Professor S. A. Forbes, I find a most remarkable species, which I am satisfied must be located in the *Syrphidæ*, though the wing shows no sign of the spurious vein, and the first posterior cell is open. The third antennal joint bears a terminal arista, which character is shared by only two previously known North American genera; but the remarkable character of the fly lies in its hind tarsi. These are most abnormally developed, probably only in the ♂ sex, and might well be taken for monstrosities, did they not fully correspond with each other. I regard this as a secondary sexual character.

This syrphid will probably demand the erection of a separate tribe for its reception, its venation being radically different from both *Pelecocera* and *Ceria*, the two genera above referred to as possessing a terminal arista. The wing and hind tarsus are figured in outline, merely to give a more correct idea of the characters of this peculiar fly. On account of its elaborately developed hind tarsi, I propose the name CALOTARSA for the new genus.

CALOTARSA, nov. gen.

Rather small, cinereous or blackish with yellow bands on abdomen, the latter thinly pilose. Eyes contiguous in ♂ for fully ⅔ distance from ocelli to base of antennæ, bare, extending on sides nearly to oval margin. Ocelli situated on vertex. Antennæ small, all three joints short, the

Digitized by Google

third but little longer than the second, rounded and laterally compressed but small, with a delicate, bare, terminal arista which is 2-jointed at extreme base. Face bare, wholly dark coloured, not prominent, neither carinate, tuberculate, nor hollowed, rather abbreviated below. Thorax narrower than head, with a few weak bristles posteriorly and on scutellum. Abdomen at base about as wide as thorax, narrowing posteriorly. Hypopygium prominent, curved under the abdomen. Wings (see fig. 4) longer than abdomen, spurious vein absent, third vein straight and not bent into first posterior cell, marginal cell wide open, anterior cross-vein far before middle of discal cell and rectangular, first posterior cell open, an apical cross-vein springing from fourth vein about as far beyond posterior cross-vein as length of latter, this apical cross-vein evenly bowed in and leaving the remaining section of fourth vein as a stump at its origin. While the apical cross vein greatly narrows the first

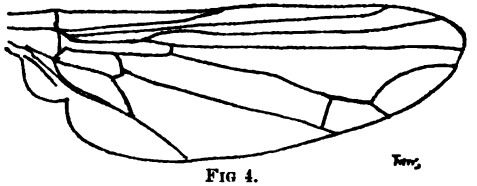


FIG 4.

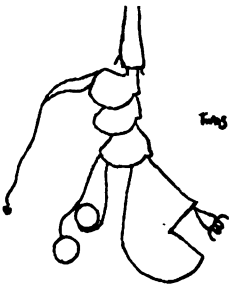


FIG 5.

posterior cell, this stump, or rather this last section of the fourth vein, proceeds on to the margin of the wing, thus forming an extra posterior cell. Posterior cross-vein nearer to margin of wing (on fifth vein) than ½ its length. Anterior and middle metatarsi about as long as remaining tarsal joints together. Hind metatarsi (see fig. 5) and two following joints equal, widened outwardly, thin and flattened, the metatarsus on its outer edge with a long slender cilium or petiole which is winged at its base; the third tarsal joint with a similar cilium, but not winged at base, bearing two round, thin and flattened chitinous tips or appendages, one at the end, the other on posterior border of cilium a little beyond middle and connected with base and inner extent of cilium by a clear thin membraneous wing; fourth joint more elongate, its body or inner portion more thickened, but furnished outwardly with an enlarged thin and flattened wing which is strongly notched on its posterior inner border,

Digitized by Google

convexly curved on its outer border, and fully 3 times as long as the flattened joint preceding; fifth joint and claws normal.

Calotarsa ornatipes, nov. sp, ♂.

Eyes cinnamon-brown; face, anterior portion of front, cheeks, occiput, and oral region cinereous. Antennæ fulvous, arista brownish. Thorax cinereous, with four brownish vittæ. Scutellum cinereous. Abdomen light brownish, all of second, third and fourth segments except hind borders dark yellow, the yellow on fourth segment being more of a rufous, fifth segment and hypopygium nearly black; thin pile of abdomen yellowish on three anterior segments, darker posteriorly. Front and middle legs light fulvous, tarsi hardly darker. Hind legs fulvous, distal ⅔ of femora blackish, first three tarsal joints and body of fourth clothed with brassy hairs; the winged base of petiole on metatarsus light brownish; the chitinous tips or plates of petiole on third joint, wing of fourth joint, and whole of fifth nearly black. Claws and pulvilli a little elongate. Wings nearly hyaline, hardly tinged with tawny, the third costal cell pale yellowish. Halteres large, knobs brownish, stalks yellowish.

Length, hardly 6 mm.; of wing, 6 mm.

Described from a single ♂ specimen. Illinois.

BOOK NOTICES.

MONOGRAPHIE DES PHYCITINÆ ET DES GALLERIINÆ: PAR E. L. RAGONOT.

The first volume of M. Ragonot's long-expected Monograph of the Phycitinæ and Galleriinæ of the World has just appeared, and forms a quarto volume of 658 pages, besides 56 pages in the preface and introduction, and three plain and twenty coloured plates.

The first plate is devoted to structural details of the head, palpi and antennæ, while the next two plates represent the various forms of venation. The remaining twenty plates represent from twenty to twenty-five species each, with the body and wings of one side, while, in some cases, the underside of the wings of the other side is represented. Many structural details of the head, palpi and antennæ are also exhibited on these plates.

The figures are very accurately and beautifully drawn, and show a delicacy and softness rarely seen. An attempt has been made, for the first time, as M. Ragonot truly says, to represent the veins in the hind

Digitized by Google

wings correctly, and this seems to have been done quite successfully. The colouring, however, is not as satisfactory, in some cases, as could have been desired.

The introduction gives a complete history of the sub-family and of their structure and classification, and, at the end, a synoptical table of the genera of the Phycitini, the first division of the Phycitinæ. The second division (Anerastini) and the Galleriinæ will appear in the next volume.

It will be seen that M. Ragonot does not agree with many English and American entomologists in classification, for he regards these insects as a sub-family, while many others give them family rank. I must confess that I have, for a long time, been of M. Ragonot's opinion, and varied from it in Smith's List of the Lepidoptera only for the sake of uniformity, since the plan of that work was determined by others. It was a case of "Mohamet and the mountain."

The entire work will form two volumes of Romanoff's magnificent Memoirs of the Lepidoptera, and all the species will be figured, so far as it is possible to secure specimens, except such as have already been figured. American students of the Microlepidoptera, as well as those of other countries, owe a debt of gratitude, not only to Mons. Ragonot for the excellent manner in which he has done his work, but also to His Imperial Highness the Grand Duke Nicolas Mikhailovitch, for affording M. Ragonot the opportunity of publishing this beautiful and useful work, and of illustrating it so profusely. C. H. FERNALD.

EVOLUTION AND TAXONOMY: An essay on the application of the theory of natural selection in the classification of animals and plants, illustrated by a study of the evolution of the wings of insects and by a contribution to the classification of the Lepidoptera, by John Henry Comstock, B. S. The Wilder Quarter-Century Book, pp. 37–113.

All scientific entomologists will be gratified at the appearance of this paper, which is an attempt to base a classification of the Lepidoptera upon the ground of evolution. It is evolution by natural selection, not befogged by the questionable action of so-called "acquired characters." The Lepidoptera are divided into two suborders, the Jugatæ and Frenatæ, according to the two essentially different methods of uniting the fore and hind wings in flight.

The primitive venation is supposed to have consisted of six principal veins or groups of veins, from which the present ones were derived by a

Digitized by Google

process of specialization in adaptation to new conditions of life. A nomenclature is adopted for these veins, following Redtenbacher, which is to be applicable to all insects, taking account of the veins developed in certain families between radius (sub-costal) and media (discal), and between media and cubitus (median). These the author believes to be of secondary origin. The paper is illustrated by 33 figures of venation and three plates.

It is a valuable contribution to American entomology, and should be carefully read by all who wish to see a scientific classification take the place of the misty divisions heretofore in use in Lepidopterology.

HARRISON G. DYAR.

CORRESPONDENCE.

PAPILIO CRESPHONTES.

On the 17th of October I found near London a colony of larvæ of this butterfly, from one nearly full fed to half-a-dozen little ones about half an inch long. J. ALSTON MOFFAT, London, Ont.

ON TRIÆNA.

The generic term *Triæna* is used by Hübner (see my list, CAN. ENT., xvii., 95, of the North Am. Dagger Moths) for a genus of *Noctuidæ*. Consequently, the Thysanurid genus (CAN. ENT., xxv., 318) must be renamed, and may be called *Macgillivraya*, with *T. mirabilis*, Tullb., as type. A. R. GROTE, A.M.

EUDRYAS CYPRIS.

I would add to my description of this South American species in the Dec. No. of the CANADIAN ENTOMOLOGIST, that the point in which it agrees with *grata* is the deep, outward, even sweep of the pale median field of primaries. In *unio*, the uneven outer margin of the median field is nearly perpendicular from within apices on costa to above internal angle. *Cypris* differs from *grata* by the darker marginal band being continued inwardly from apices along costa, as also by the absence of the prominent dark costal stripe from base outwardly. The darker, creamy and olivaceous or ochraceous median field of primaries, as well as the red unbanded hindwings and undersurface, are quick characters by which *Cypris* may be distinguished from either of its allies. A. R. GROTE.

Mailed February 3rd.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, MARCH, 1894. No. 3.

NOTES ON "A REVISION OF THE GENUS ŒNEIS" (CHIONOBAS), "BY HENRY J. ELWES, F. L. S., F. Z. S., PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF LONDON, AND JAMES EDWARDS, F. E. S.," TRANS. ENT. SOC., LOND., 1893, PART IV. (DEC.).

BY WM. H. EDWARDS, COALBURGH, WEST VA.

Mr. Elwes has again favoured us with one of his periodical Revisions of Genera, the last of which, relating to Argynnis, was reviewed by me in the CAN. ENT., XXII., p. 81, 1890.

It is stated that Mr. James Edwards is responsible for the matter of what are called "clasps" of the male, meaning the claspers of other authors; and these parts of the whole body of abdominal appendages are the only ones treated of, or relied on. He has also given a comparative table at the end, based partly on the facies, and partly on the claspers. A plate of these last is appended. On p. 458 is a statement of "the types of clasp-form" found in the genus: "in *Norna* and *Jutta* *there is an unusual amount of variation*, but the differences are merely those of degree, and are not, in the most extreme cases, sufficient to obscure the relationship of the species." Of like types of the "clasp-form" are:—

1. *Chryxus*, *Bore*, *Taygete*.
2. *Urda*, *Uhleri*. 3. Foreign all.
4. *Semidea*, *Jutta*, *Fulla*.
5. *Subhyalina* (which, according to Elwes, is *Æno*, Boisd., and *Crambis*, Freyer), *Brucei*, *Norna*.

It strikes me that it is rather odd, if claspers are tests of affinity or separateness, that *Chryxus* and *Bore* should fall together; or *Semidea* and *Jutta*; or *Æno* and *Norna*; in each case the two species named

Digitized by Google

belonging to different sub-groups. *Brucei* as a species was pronounced by Dr. Staudinger originally to be a form of *Bore*. Turning to the plate, it appears that the claspers of *Norna* and what is called "*Semidea*, Colorado form," (and which is *Æno*, Bdv.) are sufficiently alike to be one species, though widely separated by the facies, and *Semidea* of the White Mts. is farther from *Æno* than from *Norna*, though the first two are of one sub-group. The truth is that claspers, or the whole body of abdominal appendages, are unreliable for determining what are species. Mr. Scudder unwittingly gave the *coup de grace* to that fad, when he said, p. 329, Butt., N. E., of Grapta *Interrogationis*, that "the two forms of this species, *Fabricii* and *Umbrosa*, *differ so greatly and so constantly* from each other, not only in the colouring, but in the form of the wings, and *even in the abdominal appendages, that they have been considered as distinct species.*" That is, if they had not by breeding from the egg been proved to be one species, they would be considered as two! But in Mr. Scudder's plates, which are a marvel of drawing, and are of undoubted accuracy, several species of Argynnis have one style of organs; so several Graptas; several Phyciodes, several Theclas, several Limenitis, several Colias, etc.; differing between themselves in each case not more than the individuals of any one species would doubtless differ. We read even in this Revision under view that in *Norna* and in *Jutta* there is an unusual amount of individual variation in the claspers. Of course there is such variation everywhere. In every part of the organization of every species there is individual variation. I have before gone into this subject pretty fully, in the CAN. ENT., XXIII., p. 55, and need not say more here. Though I may as well add that by Mr. Scudder's plates the allied groups do not always show the same style of organs, thus: Grapta *Progne* cannot be distinguished from Grapta *Comma*, though they belong to different sub-groups, while Grapta *Faunus* differs conspicuously from *Comma*, though these two belong to one and the same sub-group. Twenty years ago, before the larvæ of these species had been reared, Dr. Staudinger and others, judging by the facies, insisted that *Faunus* and *Comma* and Grapta *Satyrus* were nothing but one species. See Butt. N. A., Vol. I., Note to G. *Comma* text. And this, by the way, is a good illustration of the unreliability of facies alone for determining species which are closely allied. In my opinion, after reading what has been published by Mr. Scudder on the genitalia, and carefully going over his beautiful plates, I deny that claspers and all the organs together are valuable for the pur-

Digitized by Google

poses claimed. They may be of aid in case of families and genera; but are unreliable, and therefore valueless in case of species.

We now come to the list of species, p. 460. I shall speak only of the North American species, for I have no acquaintance with others, except such as specimens of the butterflies in my collection afford, and in several cases I have never seen the species. Under *Nevadensis*, Felder, are ranged *Gigas*, Butler, *Californica*, Bdvl., and *Iduna*, Edw. "After comparing very numerous specimens in my own and other collections, from California, Oregon, Washington and Vancouver Island, of which the last was sent me by Mr. Fletcher as *Gigas*, I cannot allow that the differences relied on by Mr. W. H. Edwards between these *Californica* and *Iduna* are of any weight, and I have no hesitation in uniting these four supposed forms. The habitat of THIS SPECIES is peculiar. I have TAKEN IT in Oregon, *at about 2,000 feet*, flying *in stony or rocky pine woods, where there was not much undergrowth.* IT *occurs as high as 7,000 feet, on Mt. Hood, in the same State, according to Morrison, and is common in the pine forests* of Mendocino County, California." That is as good a sample of the illumination of this author as I could select. He has become possessed of, or has seen numerous specimens of THIS species, (one, or at most a trifling number, was sent him as *Gigas)*, and undertakes to decide off-hand that all these forms are one species, and that IT flies in Vancouver Island, Mendocino and Oregon. Mr. W. G. Wright has taken *Gigas* on Vancouver Island two seasons; has taken *Iduna* at Mendocino two, if not three, seasons; and *Californica* in Washington. He is positive that they are three distinct species, from their habits of flight, and his observations on their behaviour in natural state; and from the character of the regions they constantly inhabit. Mr. Fletcher, who has taken *Gigas* in Vancouver, has written me since he has seen this Revision:—"I don't agree with him that *Nevadensis* is the same as *Californica* and *Gigas* at all. All three are to my mind quite distinct, in the males at any rate."

I, myself, have never seen one of these species alive, but I have bred two of them from egg to adult larva, namely, *Iduna* and *Californica*, in both cases the larvæ reaching the adult stage the same season, but dying before pupation; and twice I have reared larvæ of *Gigas* to the second moult, when they all hibernated. In fact, I have, or ought to have, larvæ of *Gigas* alive to-day. And from these stages, and the behaviour of the larvæ, I am certain there are three species. As Mr. Elwes speaks of the "differ-

Digitized by Google

ences relied on by Mr. Edwards," he refers to my plates and text in Vol. 2, B. N. A., 1875; and I should here say that when those plates were published, my information as to all these forms was very meagre, and very few examples were in collections. As to *Gigas*, I had never seen the male, and the only one known to be in any collection was the type specimen in the British Museum. So my figure was given from a drawing made for the purpose at the Museum, and it was badly coloured, and inadequately represented the under side of the hind wing, which in this genus is usually the most characteristic part of the insect. As to the female, it was copied from the best of three poor examples which I had from Mr. Crotch, and these were the only examples of the species in American collections. The figures of *Californica* and *Iduna* are well done. I intend before Vol. 3 closes to re-figure *Gigas*, and to give all the stages I may then be able to; and all the stages of the other two except the pupæ. As to *Nevadensis*, it is not a fourth species, though I let it stand alone, not knowing to which of the three it was intended to apply. It was impossible to decide from the very poor figure or the description. I rather thought it was meant to represent *Californica*, but Dr. Holland is confident that it was intended for *Gigas*. If this is so, apparently the name of the Vancouver species should be *Nevadensis*, as the catalogues date it 1867, whereas *Gigas* dates 1868. But Mr. Butler has informed me that Felder antedated by one year his species. It was really not published and on sale till 1868, and subsequent to the issue of the Cat. of Satyr., which figured and described *Gigas*, and so *Gigas* would have priority. A vast deal has been learned respecting these species since 1875, and they are now by no means uncommon in collections.

That Mr. Elwes is sometimes willing to allow that habitat and habits of flight are a factor in determining species, as well as distinct geographical ranges, appears in what he says of *Ivallda*, on p. 469:—"I was inclined to think *Ivallda* was a pale form of this (*Chryxus*), as I could not see any distinction but that of colour. Prof. Owen, however, who has taken both, assures me that the habitat and flight of the two differ; and, as the geographical range of *Ivallda*, which, so far as we know, is confined to the Sierra Nevada, in Placer County, California, and about Lake Tahoe, is quite distinct from that of *Chryxus*, which is not known to occur in the Rockies in the U. S., *it may probably be looked on as a constantly distinct species*." This is really sensible and to the point. Mr. Bruce had written me from Colorado, last summer, after spending a day

Digitized by Google

on the peaks with Mr. Elwes :—" In *Ivallda*, as a species, he utterly disbelieves, though Mr. Owen said there was a vast deal of difference between the habits of it and *Chryxus*." Mr. Elwes afterwards visited Professor Owen, and it appears yielded his prepossessions. But why does not a difference in habits and flight and geographical range in the three species before spoken of indicate differences which are specific, as well as in *Ivallda* and *Chryxus* ?

On page 466, our author thinks that in the absence of any confirmation of Mr. Fletcher's statement that "a single female of *Macounii* was taken at Morley, Alberta, he is inclined to think this female must have been *Nevadensis* "—which is the first time I have heard that a statement of Mr. Fletcher's needed confirmation by another witness. " But our entomological knowledge of the vast tract of prairie and forest north and west of Lake Superior is so trifling that I have little doubt that it (*Macounii*) will be discovered elsewhere." In the Revision of Argynnis, this author laid it down as a proposition that North America was now so thoroughly explored that no more new species of Argynnis need be expected to appear. Since the publication of which I have described six new species of Argynnis, three of them as pronounced as *Atossa*, *Alberta* and *Victoria*. It is unsafe to prophecy.

Under *Uhleri* is put *Varuna* as identical. " It is impossible to separate the two forms," p. 472. *Varuna* is a plains species, in Dakota, according to Wiley, living on the "bad lands," and on rolling and plateau prairie, which is covered with grass and sage-bush, the elevation about 2,000 feet. Morrison took it in Dakota also, elevation 1,200 feet. Mr. Wright took it in Montana, on the foot-hills of the low, isolated mountains, considerably to the East of the Rockies. He says : " I have never seen it flying west of the Missouri River, nor on any of the spurs of the chief Rocky Mts. It flies only on the lower slopes, say at 7,000 feet or so above the level lands." Mr. Elwes says, that in the Rocky Mts. of Alberta it goes up 4,000 feet, at Kananaskis, which would be equivalent to upwards of 5,000 in Colorado ; but that he has taken *Uhleri* in the Rockies at 9,000–10,000 feet, and in Yellowstone Park at 7,000. Mr. Bruce says *Uhleri* is taken at from 5,500 to 10,000 feet, in Colorado. One and the same species of Chionobas does not fly on low grassy plains and on alpine peaks. The differences in the facies of the imago are patent enough to an experienced eye. Undoubtedly they are two

Digitized by Google

species. I have treated sufficiently of this matter in Part 12, Vol. III., B. N. A. The case is parallel to that of *Chryxus* and *Ivallda*, allowed by the author to be two species. But, if *Varuna* cannot be separated from *Uhleri*, how can the author be sure that the Kananaskis examples at 4,000 feet (5,000 + of Colorado), were not *Uhleri*? It is altogether probable they were. On p. 467, a new species called *Alberta* is described, from Calgary. It is a curious thing that this *Alberta* is put between *Ællo* and *Chryxus*, though it is said to "bear the greatest superficial resemblance to *Taygete*." Now, on comparing the description of *Alberta* with the plate and description of *Varuna*, in B. N. A, Vol III., these two cannot be distinguished from each other. Mr. Fletcher tells me he sent me an example of this *Alberta* a year ago, and I returned it labelled *Varuna*. Really this is too too! Why then all this jumble about three other non-allied species?

Mr. Elwes does not think that *Semidea* is found in Labrador; at least he has seen no specimens from that quarter. Here I am pleased to say that I agree with him, as I have never seen a *Semidea* from Labrador. But he has no doubt that a specimen in Mr. Lyman's collection from Hudson's Strait is *Semidea*. Similarly I have a single example, a female, taken at Fort Chimo, Hudson's Strait, that I consider to be *Semidea*. The species will be fully illustrated in Pt. 15, B. N. A., Vol. 3, soon to issue. What Möschler distributed as *Semidea*, from Labrador, was *Æno*, Boisd., and *Æno* is the species taken on the peaks of Colorado. *Assimilis* is a variety of *Æno*, taken in both localities. It is without a band on under hind wings, or almost none. I have treated fully of these forms in Part 14. Mr. Elwes continues, p. 473: "All authors who have yet examined specimens of the form occurring in Colorado seem to agree in identifying them with the typical White Mountains *Semidea*, but, on comparing a series of five pairs from each locality, I can certainly pick out the Colorado specimens by the following characters," etc., etc.; closing thus: "I certainly think there is good ground for looking on it as an incipient species." It is identical with Labrador *Æno* beyond a doubt.

This brings us to *Subhyalina*, Curtis, p. 475:—"I have had more difficulty in dealing with the synonymy of this species than any other, but, *after having compared the unique type of Subhylina*, Curtis, in Guenee's collection, kindly lent me by Mr. Oberthur, the figure of *Crambis*, given by Freyer, the type of *Assimilis*, in the British Museum, and several other specimens in the British Museum from various parts of Arc-

Digitized by Google

tic America, as well as from Hudson's Straits, I have come to the conclusion that it is impossible to distinguish more than one species. *It is true that the variations in size, colour and distinctness of the band on the hind wing below are great*, but not greater, or even so great, as that found in some other species I have already dealt with," and so on; "this opinion is confirmed by Mr. J. Edwards's examination of the clasps of some of the specimens differing most remarkably in appearance, *including the type of Subhyalina*, in which, fortunately, a critical examination is possible without dissection." I assert that the author here is totally wrong, and that he has mixed up two, if not three species, and I deny that the example in the Oberthur collection is the type of *Subhylina*, Curtis. Curtis described a single male, no other example taken, which, he says, he thought at first sight was an old and faded specimen of Hipparchia *Rossii*, just before described. But, on examination, "it proved to be in good condition." He says it is black and the wings are semi-transparent, and the name *Subhyalina* implies that it is nearly transparent. Hyaline, in the dictionary, is given as glassy, transparent. Now, *Crambis* is a comparatively opaque species, and no more hyaline than are the leathern wings of a bat. *Æno*, Boisd, is somewhat translucent, about as much so as *Semidea*, not transparent, like C. *Brucei*, which is a sub-hyaline species. Neither of these has the peculiar appearance which led Curtis to think it old and worn. *Crambis* is dark brown, *Æno* is brown, varying from livid to yellow-brown. Boisduval, Icones, p. 195, describes the color as "un gris-brunatre-livide melé de jaunatre." *Assimilis*, as I have said, is an unbanded form of *Æno*, and was described by Mr. Butler in his Catalogue of Satyridæ. I sent two examples, one quite unbanded, the other partly, to Mr. Butler, and he pronounced them his *Assimilis* "undoubtedly." It is found wherever *Æno* flies, and copulates with *Æno*. *Subhyalina* was taken in 1830, described in 1835. In course of sixty odd years the chances are against the survival of any particular cabinet insect. It has a hundred enemies, beside the possibility of accident. It is not an unknown thing for the owner of a collection of insects, when a type is destroyed, to attach the label to another example that seems near, or pretty near, the original. He knows of the accident, and of the shifting of the label, and would explain it if circumstances rendered it necessary. But he dies, and his collections pass to another hand, and no one notices the discrepancy between the description and the supposed type. It is the rule that when description and type are found to be antagonistic, the latter must be ig-

Digitized by Google

nored, and the description alone is the guide. We may be very sure that Curtis never described a brown, semi-opaque, or a yellow-brown semi-translucent insect as sub-hyaline; nor would he have given the name of black to those very different hues; nor would brown and yellow-brown insects have shown the worn and faded appearance of which he speaks, and yet have been said by him to be "in good condition." To reduce *Crambis* or *Æno* to a worn and faded appearance, a pretty complete abrasion of the wing-scales would have been required. It is impossible that the Oberthur insect should be the type described by Curtis. Moreover, Boisduval described *Œno* in 1832, and if it and *Subhyalina*, Curtis, were the same species, *Œno* would have the priority. The history of this Oberthur specimen is this: after Curtis's death, Mr. Henry Doubleday purchased the types of Curtis's Arctic butterflies, and gave them as a present to M. Guenee. And my informant adds, "I think it quite possible that the label may have been displaced. It is even possible that Curtis did not label his types, and that Doubleday may have done the work after Curtis's death, and done it incorrectly. At any rate, if the supposed type does not answer to the description, it is tolerably certain that the type label cannot belong to it. M. Guenee hardly touched the diurnal Lepidoptera, he was essentially a student of the Heterocera. You ask, Why was not the type in this case placed in the British Museum? Probably Doubleday did not attach the importance to type specimens which we do now-a-days."

I will quote here a few lines from a well-known paper of twenty years ago, by the lamented W. Arnold Lewis, entitled "A Discussion of the Law of Priority," 1872. On p. 23: "Now, let us see what real assistance in the way of achieving certainty entomologists can obtain from inspection of type-specimens. He who examines an author's types may find them just as the author placed them, and bearing his labels. On the other hand, he may find them sorted and re-arranged, without labels or fresh ones. * * * He may find the author's labels affixed to species for which they were not meant. Dr. Staudinger says: 'It happens that authors after having created species afterwards mix up in their collections, together with the originals, species which are very near to them,' and Mr. Dawson says: 'Suppose Stephens's collection, instead of coming to us direct from the hands of its compiler and owner, three years ago, had become antiquated, like the Linnean; or *suppose the*

Digitized by Google

question of the types to be discussed some 60 or 70 years hence, with no more definite knowledge on the subject to assist the inquirer than the Stephensian types and the Stephensian descriptions would supply; might it not be argued that the types (in the cases under discussion) must be ignored, as they never could have been intended to represent the true Loppa pulicaria, Steph, *because they are antagonistic to the description?*'"

Again, quoting Dawson: "Dr. Schaum invariably refers to the Stephensian types; my references are frequently given to Stephens's works, irrespective of the types. Now we are well aware that these do not always correspond, but that, on the contrary, considerable difference is often to be found between them.

"Before the Linnean collection was placed in its present quarters, it was so maltreated by additions, destructions *and displacemeut of labels*, as to render it a matter of regret that it now exists at all."

I must express my astonishment that the author of this Revision should have undertaken to overturn the work of two generations of entomologists, and to mix up several species as one by reference to a single type insect, taken 64 years ago, represented, as he should at once have seen, by a bogus specimen!

The description of Curtis, on which is our sole reliance, applies closely and almost exactly to the species taken at Laggan, and to which Mr. Elwes gives the name of *Beanii*. It is sub-hyaline, as much and perhaps more so than *C. Brucei*. It is pale black, and it has the faded and worn appearance mentioned by Curtis, particularly so by its clouded and smoky underside. The other markings agree well with his description. I described this species as *Subhyalina*, Curtis, in CAN. ENT., XXV., p. 137, 1893, and in Part 15, Vol. 3, B. N. A., it will be fully illustrated. The reading of this so-called Revision convinces me that I was and am right.

In Part XIV. I gave the series of the American species thus: 1 *Crambis*; 2 *Brucei*; 3 *Æno*, and its var. *Assimilis*: 4 *Semidea*; 5 *Subhyalina*; rejecting *Also* as not American, and I hold to this to-day.

Digitized by Google

On p. 459, Chionobas *Stretchii*, Edw., is excluded from consideration, on the ground that it is the same thing as Hipparchia *Ridingsii*, "of the same author." As the fact that *Stretchii* was not a Chionobas has been known for many years, and published in my catalogues, it was not necessary to refer to it in the Revision. But I will take this opportunity to say that the types, a single pair, have disappeared. They were returned by me to Dr. Behr, after description, 1870. I did not consider them *Ridingsii* then, of course. Now, on comparing the description with that species, I am sure it is not *Ridingsii*. Nor is it *Dionysius*, the other of the known American species of Neominois. Mr. Bruce has suggested that it may be a third species of the genus, inhabiting Nevada (whence the types came) and the deserts of N. E. California, a region thus far wholly unexplored by naturalists. Mr. W. G. Wright goes there with a party of botanists and ornithologists the coming summer, and I trust he will re-discover *Stretchii*.

The value of publications of the class of the Revision under view depends much on whether or no the author is thoroughly acquainted with his subject, and such acquaintance implies considerable experience as a lepidopterist, and study of the forms he undertakes to speak of. He should have an eye for specific differences, and while this comes in part by training, it is largely a natural gift. Some lively workers go all their days without having this originally or attaining it. He should have made himself acquainted with the preparatory stages of as many of the species treated of as possible, for there never will be a final, authoritative revision of any genus of butterflies whatever till these stages in every species of it are known. Species are as clearly distinguished by the form and sculpture of their eggs, by the forms and appendages of the caterpillars, and by the peculiarities of the pupæ, as by the facies of the imago. No man can speak with authority who relies simply on the facies of the imago. This feature has been the occasion of the endless and irreconcilable differences that prevail in nearly all genera up to this day. To proceed further in the same direction is plainly a waste of time. It is a case of the blind leading the blind to undertake to bring order out of the confessed confusion by appealing to facies. Add to the qualifications I have enumerated an acquaintance with the behaviour, habits of flight, and localities of the species, either from personal observation or reliable reports of thoroughly good observers. When an author has this equipment he may with good reason undertake to revise genera, and his decision will be respected.

Digitized by Google

PREPARATORY STAGES OF LAPHYGMA FLAVIMACULATA, HARV., AND OTHER NOTES.

BY HARRISON G. DYAR, NEW YORK.

Laphygma flavimaculata, Harvey.

Determined by Prof. J. B. Smith. Eggs of this species occurred to me in the Hawaiian Islands at Kaawaloa, Kona, Hawaii and at Honolulu, Oahu.

Egg.—Nearly spherical, flattened at base, densely striated vertically; of a flesh-coloured tint, and covered with gray down; diameter, 0.6 mm. Deposited in a large mass on a grass stem.

First stage.—Head rounded, slightly bilobed, shining black, labrum whitish; width, 0.3 mm. Body small, the feet perfectly normal, the thoracic ones black, the others whitish like the body. Warts arranged much as in Arctia, concolorous with the body, inconspicuous, each with a single stiff black hair. Larva walks rapidly, with a slightly geometriform motion.

Second stage.—Head shining blackish-brown, much paler in front over the clypeus and mouth; width 0.55, mm. Body enlarged at joint 12; bluish green, the tubercles distinct, black, each with a black seta. Dorsal, subdorsal and lateral whitish lines, distinct, even; subventral space whitish, but with no distinct line. Feet normal, all pale, the thoracic ones slightly testaceous. Cervical shield largely shaded with black or brown.

Third stage.—Head dark brown, nearly black, shining; a paler stripe over the ocelli; a few hairs; width, 0.8 mm. Body blackish-green; distinct dorsal, subdorsal and lateral pale green lines, the lateral one narrower than the others. Subventral space and venter pale, defined above by a pale green subventral band, which contrasts with the dark colour of the dorsum, but is only a shade lighter than the venter. Piliferous dots black, distinct, each with a minute black seta.

Fourth stage.—Head entirely black; width, 1.2 mm. Body velvety black, green centrally on the venter, with very narrow, broken, double dorsal, single subdorsal and lateral, and broad, greenish-white subventral lines, the latter not reaching to the last segment. Setæ short, black, the dots no longer distinguishable. Feet pale green, tipped with blackish. Spiracles white. The larva curls spirally when at rest.

Fifth stage.—Head shining black, a little mottled with pale brown on the sides; width, 1.8 mm. Body deep sooty black; the space between

Digitized by Google

the two narrow dorsal lines is paler, giving the appearance of a broad, pale band with defined edges; subdorsal line triplicate, narrow, faint; lateral line single, more distinct than the others; subventral one not broad, but distinct, yellowish with a green shade centrally. Spiracles white. Venter pale green; feet pale, all tinged with testaceous.

Sixth stage.—Head rounded, shining black, the sutures of clypeus and antennæ white. A pale brown, mottled lateral band. Width, 2.7 mm. Body sooty black to the venter, which is pale whitish, tinged with red, the subventral region less deeply black than the dorsal. On joint 2, a distinct, narrow, white dorsal and subdorsal line, the dorsal absent on the rest of the body. A super-stigmatal, fine, white line, with a series of five very narrow, faint lines above it bluish-white, and broken minutely into dots. Above these two more lines, further apart than the five are from each other, more distinct and continuous. The upper one of these lines joins the subdorsal line on joint 2, but is much narrower than it is. Spiracles white. Subventral line broad, its edges irregular; pale yellow with a central dull greenish or reddish shade. Subventral space mottled with yellowish. Feet pale, greenish outwardly and tipped with reddish. Setæ present, short, dark. As the stage advances, the dorsal line appears, resembling a shining black band against the sooty black ground colour. Subventral space blackish, densely mottled with round, pale spots.

At end of this stage the larvæ enter ground.

Pupa.—Of normal shape; cremaster of two separate, rather distinct, slender points, directed backward. Colour uniformly light brown. Length, 13 mm.; width, 4 mm.

Food plants.—Grasses.

Tæniocampa pacifica, Harvey.

Four stages observed (full number, six?) with the following widths of head:—1.1 mm., 1.5 mm., 2.[2] mm., 3.2 mm.

Mature larva.—Head whitish-green with a few black piliferous dots. Body enlarged at joint 12; feet normal in all the stages observed. Body green, speckled with white; piliferous dots small, black. Narrow dorsal, faint subdorsal, stigmatal and faint subventral white lines, the upper two connected on joint 12 by a broad white band on the hump. The stigmatal line passes on to the anal feet. A white line on anterior edge of cervical shield. Another larva, probably the same, had its head brownish-testaceous, mottled with whitish, clypeus whitish, with a large black shade on each side. Body velvety brown, darker on the anterior portion

Digitized by Google

on the segments and minutely mottled with pale. A very broad, distinct, white stigmatal line, enclosing the black spiracles and shaded faintly on each segment with pink and yellow, passing very narrowly on to anal foot. On joint 12, on the anterior [illegible] of the hump, a dark brown subdorsal shade, defined on its posterior side, diffuse before. There are traces of dorsal, subdorsal and lateral whitish lines. Found on maple and wild cherry.

Larvæ from Yosemite, California.

Forms a firm cell in the ground without silk.

Xylina oregonensis, Harvey.

Head moderately bilobed, smooth, shining green, mottled obscurely with yellowish-green; mouth parts pale, whitish; jaws dark; ocelli brown; width, 3.7 mm. Joint 12 not enlarged; joint 13 small. Lustreless yellowish-green, closely covered with little, short, irregular yellow lines, resembling mottlings. Narrow, broken, almost dotted dorsal, subdorsal and stigmatal lines, the latter passing obscurely on to anal foot. Lines of equal width and much resembling the mottlings. Spiracles small, white with narrow black edge. Piliferous dots distinct, white, each with a single, short, pale seta. Tips of abdominal feet pale. Later in the stage the markings become more distinct, the stigmatal line pale yellow, spotted with red.

Food plant.—Oak (*Quercus Kelloggii*).

Determined by Prof. Smith from two crippled specimens.

Xylomiges perlubens, Grote.

Egg.—Spheroidal, flattened, closely reticulated, the depressions between forming vertical rows, at the micropyle forming a radiating circular row of smaller cells. There are about 40 rows around the egg. Colour, sordid, pearly white, not shining; diameter 0.7 mm. Laid in a mass, two layers deep, on the back of a leaf.

First stage.—Head pale testaceous, shining; mouth brownish, eyes black; width, 0.3 mm. Body pale whitish, subtranslucent, with large black piliferous dots. Only the last three pairs of abdominal feet are distinct, and the larvæ "loop" about very actively.

Second stage.—Head pale whitish testaceous, densely spotted with black; mouth brown; width, 0.5 mm. Body pale, soft green, joint 12 enlarged, the two anterior pair of abdominal feet smaller than the rest. Piliferous dots large, black. A broad, evident, white stigmatal line, besides narrower dorsal, subdorsal and lateral ones. Setæ black.

Digitized by Google

Third stage.—Head pale white, with large, black, piliferous spots; width, about 0.9 mm. Body blackish green. Lines white, the stigmatal a little greenish centrally. Piliferous spots large, black, faintly encircled with white.

Fourth stage.—As before. Width of head, 1.2-1.4 mm. A broad, dull red band appears in the centre of the stigmatal band.

Fifth stage.—Head shining pale whitish, reticulated with brown, and bearing a number of large, black piliferous spots; ocelli black; a blackish streak at vertex of each lobe; width 1.9 mm. Body dull green, heavily mottled with black, especially at the sides, where it is nearly entirely velvety black. Dorsal and subdorsal lines narrow, white; stigmatal line sordid reddish, bordered above and below by white. Piliferous dots black, with white centres. Feet pale.

Sixth stage.—Head pale whitish, with a tinge of green, a patch of brown reticulations on each lobe, bordered above and below by a broad, dark brown streak; a number of large, black piliferous dots; width 2.8 mm. Body enlarged slightly at joint 12, feet normal, joint 13 divided by a distinct suture. Colour blackish-green, consisting of black reticulations on a greenish ground. A narrow, black-edged, white dorsal line, interrupted by a series of black intersegmental shades, double on joint 12; a reddish tinge subdorsally; a narrow, black-edged, white subdorsal line; a broad, black, lateral shade; a broad, dull red stigmatal band, bordered with white. Venter paler, mottled with brown. Piliferous dots white, the subventral ones black. Feet pale. Setæ pale, about 1 mm. long. Spiracles white, with a narrow black edge.

Seventh stage.—As before, but the piliferous dots smaller, and the green colour is nearly all replaced by a pale brown.

Cocoon.—A cell in the ground with compact hardened walls, without any web.

Pupa.—Cylindrical, abdomen slightly enlarged centrally, cases moderately prominent; a slight depression between thorax and abdomen. Cremaster very short, consisting of two fused spines, separated at their tips, and two others outside of, but in line with these. Colour light brownish-yellow, unicolorous, but darker in the abdominal sutures. Length of pupa, 14 mm.; width, 5.5 mm.

Food plant.—Wild gooseberry (Ribes).

Prof. Smith has kindly determined the moth from some imperfect, undeveloped specimens.

Digitized by Google

TWO MORE OF WALKER'S "BOMBYCIDS."

Col. Chas. Swinhoe, of Oxford, has very kindly employed an artist to draw figures of *Heterocampa thyatiroides*, Wlk., and *Cingilia humeralis*, Wlk., for me. The latter is a synonym of *Caterva catenaria*, Cram., though I presume that the genus Cingilia (Trans. Ent. Soc., Lond. (3), i., 76, 1862,) antedates Caterva (new check list, 1882,), and this geometrid must be called *Cingilia catenaria*. It stands in the Liparidæ in Kirby's catalogue. The other name antedates its synonyms, and we have :—

DASYLOPHIA THYATIROIDES, Walker.

1862—Walker, Trans. Ent. Soc., Lond., (3), i., 79.
interna, Packard.
1864—Packard, Proc. Ent. Soc., Phil., iii., 363.
tripartita, Walker.
1865—Walker, Cat. Brit. Mus., xxxii., 419.
signata, Walker.
1865—Walker, Cat. Brit. Mus., xxxiii., 758.

THREE NEW WEST AFRICAN MOTHS.

BY GEORGE A. EHRMANN, PITTSBURGH, PA.

Syntomis hilda, n. sp.

♂.—Antennæ, head and thorax black ; first and fifth segments of the abdomen white, the rest metallic green ; primaries dark brown with three ovate vitreous spots on the sub-apical area ; discal space has two large triangular vitreous spots, the largest being near the inner margin.

Secondaries dark brown, with two small elongate vitreous spots near the base and one small round spot of the same colour in the discoidal area. Underside the brown is a little lighter than above, otherwise it is the same.

♀.—Similar to the male, except that the antennæ are tipped with buff, and the fifth segment of the abdomen is not white, thus leaving the whole abdomen metallic green except the first segment, which is white on the upperside ; the vitreous spots in the wings are the same as in the male, but much larger.

Underside same as above, except that there is a large white spot on each side of the thorax, and the first two segments of the abdomen are creamy white ; legs in both sexes are dark shining brown. Exp. of ♂, 14 mm. ; ♀, 16 mm.

One male and three females in my collection. This lovely species was first taken by Mrs. Hilda Nasmyth at Cape Palmas, Liberia, West Africa, and I esteem it an honour to name it after her.

Digitized by Google

Syntomis abdominalis, n. sp.

♂.—Antennæ deeply pectinated; head and thorax black. Colour black, suffused with blue metallic scales. Primaries dark brownish, opaque, with two large oval semi-transparent spots in the discoidal area, the largest towards the inner angle.

Secondaries black without any ornamental markings whatever; abdomen deep maroon, except the two last segments, which are black. Underside the same as above, except that the entire abdomen is light carmine, and has a very narrow black lateral stripe on each side; legs light brown. Exp., ♂, 18 mm.

Mr. G. B. Nasmyth has obtained but one example of this beautiful and unique species at Grand Ses, Liberia, W. Africa; the type is in my collection.

Pachypas Nasmythii, n. sp.

♂.—Antennæ fawn-brown, pectinations much darker; head and thorax fawn-brown; the latter with a darker brown stripe running its entire length, similar to that of *P. Honrathii*, Dewitz, and *P. subfascia*, Walker. Abdomen, on the upperside the first four segments are of a very light brown, the rest, including the underside, is of a lovely ferruginous colour. Primaries light brown, median limbal area dark or chestnut-brown; costal inner space slightly shaded with dark-brown, similar to the two darkish marks which are so conspicuous in *P. subfascia*, Wlk.; there is also a dark-brown band, almost black, running through the entire width of the forewing, but not inclined so much as it is in *subfascia*.

Secondaries, basal area whitish and thinly clothed with scales, which gives this space a semi-transparent appearance; the outer marginal space has a broad brown band, darker inwardly, but much lighter on the outer margin; anal margin the same colour as the basal area. Underside of thorax dark brown; the legs are of the same colour.

Underside of primaries, costal space as far as the limbal area, light fawn; limbal area dark brown, with some light shading in the apical space; basal part on the inner angle much paler than the rest of the wing. Underside of secondaries same as above, except that the costal area is shaded with ferruginous. Exp., 5¼ inches. Type in my collection. Habitat, Cape Palmas, W. Africa.

At first sight this noble creature bears a great resemblance to *Pachypas subfascia*, Walker, but having before me Dr. Dewitz's paper, which was published in the Nova Acta. Band, XLII., and which has an excellent figure of Mr. Walker's *subfascia* on Pl. 2, F. 12, I cannot believe otherwise than that I have a new and undescribed species to deal with; and I have named it in honour of its discoverer. Mr. Nasmyth took but two examples of this grand moth, which, I am safe to say, is the giant of the genus. One specimen is in my collection, the other in that of the Rev. Dr. W. J. Holland, Pittsburgh, Pa.

Digitized by Google

NEW NORTH AMERICAN TRYPETIDÆ.

BY D. W. COQUILLETT, WASHINGTON, D. C.

Trypeta (Acidia) tortile, n. sp., ♀. Wholly yellow except a black dot above each wing; ovipositor brown; bristles black; scutellum bearing four bristles; thorax and abdomen shining; ovipositor flat, very broad, nearly as long as the last two abdominal segments. Wings hyaline, the anal cell, bases of marginal, sub-marginal, and of the first basal cell, also the apex of the second basal cell, yellow; a black spot on furcation of the second and third veins, and one on lower half of vein at apex of anal cell; a brown band commences on costa between apices of auxiliary and of first vein, and extends to the discal cell, going over the small cross-vein and continuing as a yellowish streak into the discal cell; a second brown band commences on the costa between apices of the first and second veins, and crosses the wing, passing over the posterior cross-vein, and near its terminus sending a spur into the third posterior cell; apex of wing from slightly before apex of the second vein to beyond tip of fourth vein, brown; first and third veins bristly. Length, 5 mm. Washington (O. B. Johnson). A single specimen.

The colouring of the wings somewhat resembles Figure 9, Plate X., of Loew's "Monographs," Part III., but the fifth vein is not bordered with brown; the brown at the apex of the wing is separated at the costa from the preceding cross-band; the band crossing the discal cell is scarcely perceptible, etc.

Trypeta (Rhagoletis) formosa, n. sp., ♂ ♀. Black, the head and its appendages (except the ocellar tubercle and occiput), a line reaching from humeri to each wing, scutellum except the sides at base, halteres and legs, yellowish; thorax and scutellum sub-opaque, the abdomen shining; proboscis slender, geniculate, the apical half bent downward; sides of front and scutellum each bearing four bristles; ovipositor compressed, slightly exceeding the last four abdominal segments in length; wings hyaline, marked with three cross-bands and two spots of brown, extreme base of wing smoky; the first cross-band begins at first vein and extends over veins at bases of discal and third posterior cells, stopping near middle of axillary cell where it is much widened; the second band begins on costa between apices of auxiliary and first veins and extends over small cross-vein, and through the discal and third posterior cells to the wing margin, its greatest width occurring at the fifth vein; a brown costal spot between apices of first and second veins, extending across marginal and

Digitized by Google

sub-marginal cells; the next band begins just before apex of second vein and crosses the wing, passing over the posterior cross-vein, widest and angled at the fourth vein, the band having the form of a bayonet; a brown spot fills apex of first posterior cell (except sometimes a spot in its extreme apex), and encroaches on the sub-marginal and second posterior cell; length, 3 to 4 mm. Southern California. One male and two females.

The wings somewhat resemble Figure 16, Plate IX,, Loew's Monograph, but the first band is at apex of second basal cell, there is an additional brown costal spot between the second and third bands, the third band begins at apex of second vein, etc.

Trypeta (*Aciura*) *aplopappi*, n. sp., ♂ ♀. Black, the pleura largely brown, the head and its appendages, the legs except the coxæ, yellow, a brown vitta on outer side of front femora; knob of halteres bright red; bristles black, the short pile light yellow; front bearing four bristles each side, the scutellum bearing only two; abdomen shining, not bristly; ovipositor flattened only at apex, as long as last two abdominal segments; wings of nearly an equal width, dark-brown, the following spots whitish hyaline: two in costal cell, two in marginal cell beyond apex of first vein, the second spot extending half-way across the submarginal cell; one in first basal cell opposite apex of first vein, one in upper outer angle of discal cell, a basal spot and oblique streak crossing second posterior cell, five in third posterior cell, three of which are on the wing margin; from two to four in axillary angle; first vein bristly, the others bare; length, 4 mm. Southern California. Three males and two females, which issued in April and May from irregular galls, about 8 mm. long by 4 in diameter, on the smaller branches of *Aplopappus pinifolius*.

The wings are very similar to Figure 8, Plate X., of Loew's Monograph, but there is no hyaline spot in the first posterior cell, only one in the first basal, axillary angle not wholly hyaline, etc.

Trypeta (*Carphotricha*) *cultaris*, n. sp., ♂ ♀. Agrees in all respects with Loew's description and figure of *culta* (Monographs, etc., III., pages 276 to 279) with these exceptions: Ovipositor not longer than the last three abdominal segments; wings having only one brown ray between apices of second and third veins; no darker spot in second posterior cell; length, 6 to 7 mm. Southern California. One male and two females, in January.

Digitized by Google

These differences are constant in the numerous specimens examined but not now before me. So far as I am aware, the typical *culta* does not occur on the Pacific coast.

Trypeta (*Neaspilota*) *signifera*, n. sp., ♂ ♀. Yellow, dorsum of thorax and metanotum except the sides, opaque grayish-black, the abdomen sometimes brown; front bearing five bristles each side, the scutellum bearing four; ovipositor flattened, as long as the last three abdominal segments; wings hyaline, basal half or less of space between apices of auxiliary and first vein brown; first vein bristly, the others bare; length, 3 mm. Southern California. Six males and one female.

The wings are like Figure 10, Plate XI., of Loew's Monograph, except that the apex of the stigma is broadly hyaline.

Trypeta (*Tephritis*) *baccharis*, n. sp., ♂ ♀. Yellowish-brown, base of each abdominal segment and spot each side of middle of metanotum, dark grayish-brown; front bearing four bristles each side, scutellum also bearing four bristles; wings narrow, of nearly an equal width, opaque white mottled with brown, which is broken up into spots, except a border on the apex beginning between apices of first and second veins and extending nearly to axillary angle, where the brown is very faint; along the wing margin this border contains a white spot in each angle of the sub-marginal cell, entire apex of the first posterior cell, three spots in apex of second posterior cell, and seven between this cell and the axillary angle; the brown spots form an indistinct broad band, reaching from the stigma to the wing margin at lower end of the posterior cross-vein; first vein bristly, the others bare; length, 5 mm. Southern California. Nine males and seven females, which issued from January to April from irregular oval galls about 12 mm. long by 4 in diameter, on tender twigs of *Baccharis viminea*.

The wings somewhat resemble Figure 5, Plate XI., of Loew's Monograph, but are much paler, the darker portions forming two cross-bands, one near the middle, the other at the apex of the wing.

Trypeta (*Euaresta*) *Californica*, n. sp., ♀. Black, the head and its appendages, corners of thorax, margin of scutellum, large spots on pleura, and the legs, yellowish, halteres pink, pleura near the wings, and bases of the latter, tinged with pink; thorax and scutellum opaque gray pollinose, abdomen glabrous, shining; front bearing four bristles each side, the scutellum bearing only two; ovipositor longer than the last three abdominal segments, over three times as broad at base as at the apex; wings

Digitized by Google

brown, the following spots hyaline: four in costal cell (none between apices of auxiliary and first veins); three in marginal cell, situated between apices of first and second veins, three in sub-marginal cell of which one is contiguous to the middle spot in marginal cell and two are between apices of second and third veins; three in first posterior cell, the one in the apex reaching the wing margin, three in second posterior cell, all of them contiguous with the wing margin, four in third posterior cell, of which three are along the wing margin; three in axillary cell, two in the second basal, two in first basal, of which one is sub-basal and the other near its apex, also one in discal cell near its apex; first vein bristly, the others bare; length, nearly 4 mm. Southern California. A single female, in May.

The wings closely resemble Figure 23, Plate X., of Loew's Monograph, but there is only one hyaline spot in the discal cell, four in the third posterior, etc.

Trypeta (*Euaresta*) *araneosa*, n. sp., ♀. Grayish-black, the head and its appendages (except a portion of the occiput), halteres and legs except sometimes a portion of the femora, yellowish; bristles black, the short pile yellowish; front bearing four bristles each side, scutellum bearing four bristles; wings brown, the following spots hyaline: three in costal cell nearly filling that cell (none between apices of auxiliary and first veins), four in marginal cell, of which two are near the base and two between apices of first and second veins; five in sub-marginal cell, of which one is at the base, two near the middle and two between apices of second and third veins; five in first posterior cell, the one in the apex reaching the wing margin; three in the second posterior cell, each of which crosses that cell; four in third posterior cell, from four to seven in the discal cell, one of which touches the vein at the base of that cell; and three in first basal cell; second basal, anal and axillary cells largely hyaline; first vein bristly, the others bare; ovipositor scarcely longer than the last abdominal segment; length, 4 mm. Southern California. Four females, in January and February.

The wings somewhat resemble Figure 21, Plate X., of Loew's Monogragh, but the stigma is wholly brown and the base of the wing to apex of auxiliary vein is almost wholly hyaline, excepting a brown streak crossing the third posterior cell near its base.

Trypeta (*Euaresta*) *stelligera*, n. sp., ♂. Black, the head and its appendages (excepting the occiput) the halteres and legs, yellow; thorax

Digitized by Google

and scutellum gray pollinose, the abdomen glabrous, shining; front each side and the scutellum bearing four bristles; wings brown, the following spots hyaline: four in costal cell (a yellow dot on costa just beyond apex of auxiliary vein), two in marginal cell situated between apices of first and second veins, three in sub-marginal cell, of which two are between apices of second and third veins and the third is contiguous to the first spot in marginal cell; three in first posterior cell, the one at apex reaching the wing margin; four each in second and third posterior cells, three in each cell reaching the wing margin; three in first basal cell, of which two are near its base and the other near its apex; and one in discal cell near its apex; second basal, anal and base of axillary cells largely hyaline; first vein bristly, the others bare; length, 4 mm. Southern California. A single male specimen.

The wings resemble Figure 23, Plate X., of Loew's Monograph, but there is no hyaline spot just before apex of second vein, only one in the discal cell, etc.

Trypeta (*Euraesta*) *tapetis*, n. sp., ♂ ♀. Yellowish, the dorsum of thorax, lower part of pleura, metanotum and ovipositor, black, the abdomen sometimes marked with blackish; scutellum bearing four bristles; wings brown, the following spots hyaline: two in costal cell, one between apices of auxiliary and first veins; four or five in marginal cell, of which two or three are between apices of first and second veins; four in sub-marginal cell, of which two are between apices of second and third veins, that at tip of second vein encroaching on the marginal cell; four in first posterior cell, of which one is near the base and three near its apex, one of the latter spots sometimes being divided into two spots; three in second posterior cell, each reaching the wing margin, but two of these spots are sometimes merged into one; four in third posterior cell, three of which reach the wing margin; three in first basal cell, and two in discal cell, of which one is near its base and the other near its apex; second basal, anal and base of axillary cell largely hyaline; first vein bristly, the others bare; length, 4 mm. New Mexico (E. L. Keen). Four males and two females.

The wings somewhat resemble Figure 28, Plate X., of Loew's Monograph, but the hyaline spots are larger and more numerous, some of them merging into each other so as to form a cross-band, beginning just before apex of auxiliary vein, and reaching the wing margin just beyond apex of sixth vein.

Digitized by Google

THE ODONATA OF ITHACA, N. Y.

BY NATHAN BANKS, SEA CLIFF, N. Y.

Most of the species recorded below were collected by the writer in the vicinity of Ithaca, N. Y., during the years 1888 and 1889. I have seen the collections of others, and have found in them some forms that I had not collected. I have also examined the collection of Cornell University, and found several species not previously seen from the locality. This list is not complete, as undoubtedly more species will be found in the Cordulidæ and Gomphidæ. I have added a few notes on certain species and genera, which I thought opportune :—

CALOPTERYGIDÆ.

Calopteryx maculata, Beaur. Common about streams during spring and summer.

Hetærina americana, Fabr. A specimen was taken during the past summer by a Mr. Salant.

AGRIONIDÆ.

Lestes hamata, Selys. Uncommon, August.

Lestes rectangularis, Say. Common during July and August.

Lestes disjuncta, Selys. Uncommon, August.

Lestes forcipata, Ramb. Not common, June.

Argia violacea, Hagen. Common, July.

Argia putrida, Hagen. Common, summer.

Ischnura verticalis, Say. Common, July, August.

Amphiagrion saucium, Burm. One specimen.

Nehalennia irene, Hagen. Uncommon, July.

Erythromma condita, Hagen. One specimen.

Enallagma exsulans, Hagen. Quite common, July, August.

Enallagma Hageni, Walsh. A specimen in the Cornell Univ. collection is probably this species.

Enallagma ebria, Hagen. This has the superior appendages of ♂ deeply bifid, more so than in *E. civile*, the upper branch no longer but a little larger than the lower. A black spot above on segment two, and the black of segment three confined to the tip. Two specimens.

Enallagma annexa, Hagen. The ♂ has the apical black spot on segment two, and the apical halves of three, four and five are black; eight and nine are blue. The superior appendages rounded, blunt at apex, inferior pointed, as long as the superior. Two specimens, August.

Digitized by Google

These, together with those recorded and described by Calvert in his recent paper on the Odonata of Philadelphia, are all the species of this genus found in the northeastern part of the United States, except *E. traviata*, Selys. This was described from Mass., I have collected a specimen on Long Island, N. Y. It is hardly more than a variety of *E. aspersa*. The superior appendages are like *E. aspersa*, except the lower branch is a little heavier; the black on segment two has a projection to the anterior margin of the segment, and the black on segment three also reaches to the anterior margin in a point; apical half of seven, all of eight and nine and all of ten, except black spot above, blue. I have also taken *E. divagans* on Long Island.

GOMPHIDÆ.

Ophiogomphus rupinsulensis, Walsh. I took two specimens.

Dromogomphus spinosus, Selys. One specimen in Cornell Univ. collection labelled "N.Y,"; it is probably from Ithaca. It has been collected quite commonly at Baldwinsville, N. Y., by Mr. R. H. Pettit.

Gomphus fraternus, Say. I have but one specimen.

Gomphus villosipes, Selys. Not uncommon.

Gomphus exilis, Selys. Quite common in June and July.

Gomphus parvulus, Selys. One specimen.

Gomphus, sp. A specimen (♀) in Cornell Univ. collection, unknown to me.

Hagenius brevistylus, Selys. A specimen in the Cornell Univ. collection.

ÆSCHNIDÆ.

Anax junius, Drury. Common during summer.

Neuræschna vinosa, Say. I have one specimen, 29 July.

Æschna heros, Fabr. In Cornell Univ. collection, June.

Æschna constricta, Say. Common during July and August.

Æschna clepsydra, Say. Uncommon, August.

CORDULIDÆ.

Macromia transversa, Say. Uncommon, June, July.

Epitheca elongata, Scudd. One specimen in Cornell Univ. collection, June.

Cordulia princeps, Hagen. In Cornell Univ. collection, June.

Cordulia cynosura, Say. Common in the spring.

Digitized by Google

Cordulia semiaquea, Burm. In Cornell Univ. collection labelled "N. Y."; it is probably from Ithaca; Mr. Pettit has taken it at Baldwinsville, N. Y.

Cordulia, sp. ? I have an abnormal female near *C. cynosura*, but the hypertriagonal space of forewings crossed, the sectors barely united at apex; all the triangles crossed, no internal triangle to hind wings, three or four veinlets under the pterostigma, black spots at base of the wings, abdomen shorter than hind wings, sides of thorax without any stripe. This and *Nannodiplax vacua* may serve to illustrate how fickle are the venational characters in this family; it would be better, I think, to draw generic characters from the head and thorax.

LIBELLULIDÆ.

Tramea lacerata, Hagen. I saw two specimens of this species at Freeville (a town ten miles from Ithaca), May 31, 1889; after much trouble I captured one of them.

Celthemis elisa, Hagen. One specimen collected by Prof. Morgan.

Libellula quadrimaculata, Linn. A few specimens in the Cornell Univ. collection.

Libellula pulchella, Drury. Common during spring and summer.

Libellula basalis, Say. Uncommon, August.

Libellula trimaculata, De Geer. Common during spring and summer. This is usually placed in the genus Plathemis, which differs from Libellula only in the male genital organs, which, I think, are hardly worthy of generic rank.

Mesothemis longipennis, Burm. Common during spring and summer. I have a specimen with the triangles four-sided.

Mesothemis simplicicollis, Say. I have seen a specimen collected by Mr. O. Takahashi.

Diplax vicina, Hagen. Not uncommon, July, August.

Diplax rubicundula, Say. Common during spring and summer.

Diplax semicinta, Say. Uncommon, August.

Diplax intacta, Hagen. This is placed in the genus Leucorhinia, Britt., separated from Diplax only by structure of the vertex of head; the venational characters vary to the usual form of Diplax. Not uncommon in the spring.

Digitized by Google

NOTES ON NOCTURNAL LEPIDOPTERA.

BY A. R. GROTE, A.M., BREMEN, GERMANY.

THE SPECIES OF LITHOPHANE.

Prof. Smith says that he uses the name *Xylina* in preference to *Lithophane*, because both are catalogue names and *Xylina* has priority, since the Verzeichniss was not published until 1818 at least. My argument is, that Ochsenheimer took the name *Xylena* from Hübner's Tentamen (1808), cites Hübner and includes his type *lithoxylea*, which is not a *Lithophane*, but a *Hadena*. Consequently, *Xylina* or *Xylena* falls before *Hadena* and should not be used for this genus. I took *Lithophane*, because it thus has priority for this genus, and because it includes *socia*, which I designated as the type in 1874, being free to do so. It seems to me this course is clear. Ochsenheimer, as I have proved, admits the Tentamen as valid authority, and adopts Hübner's names out of it in a number of instances. The authority of the Tentamen is most certainly established by Ochsenheimer's action and its prior date proved. See my Buffalo list, and my papers in CANADIAN ENTOMOLOGIST on this subject. From an æsthetic point of view *Lithophane* is a more descriptive and a prettier name, although this is no argument and a mere opinion of my own. The fact is, that Ochsenheimer's *Xylina* is a mixed genus; its true type, since this author cites Hübner, is a *Hadena*. Thus it cannot, under the rules, be used for the present structural type.

I have little to add to what Prof. Smith says as to the synonymy of the species. I did not identify *signosa*, if I recollect rightly, from the collection, but while I was in Buffalo, from a study of the description in the British Museum Lists. If I made a mistake, as would now appear, it is an excusable one. But what I do not understand is Fernald's testimony, Bull. Geol. Surv., Vol. 5, 201, 1879. From this it appears that my *petulca* was "near, if not identical with Walker's *infructuosa*," a species now referred by Smith as a synonym of *confusa*, Hübner! An entirely different looking insect! Prof. Fernald does not mention my *signosa*, Walk., specifically, but says: "The only *Xylina* which I found in the Walkerean collection, under a different name from what they are known by us, was *Xylina antennata*, Walk. This is *X. cinerea*, Riley." I had only noted, in 1867, this gray species, but when I came to separate our gray forms, I found three of them, and the question was, which one of these Walker had. From my memory of the type and from Walker's description, I felt sure it was *cinerea*, and, in this instance, Prof. Fernald

Digitized by Google

is corroborated by Prof. Smith. I do not know whether Prof. Fernald had *signosa* with him, but one thing is clear, that if he had this or *petulca*, then he could not have failed to note the fact, if *petulca* was really identical with Walker's original type of *signosa*. He *had petulca*, and he considered it near or identical with *infructuosa*, Walk.! Now, has there been here any shifting of Walker's "types"? If Prof. Fernald had my *signosa* with him in 1879, then its correspondence with Walker's *signosa* would be proved inferentially by his general statement quoted above. If, again, he saw the type of *signosa*, he could not have failed to note its correspondence with the *petulca* he certainly had with him! Why did Prof. Fernald compare *petulca* with *infructuosa*, if Walker's "type" of *signosa* was *petulca*? As a matter of fact, what Walker says agrees better with *signosa* than with *petulca*; I have no sufficient material now before me to go into this point. Walker's description convinced me that he had what I call *signosa* before him when I determined and compared our species with his text, but I am aware that much better descriptions than Walker ever wrote are liable to be misinterpreted. Nor am I primarily interested to rescue my name. I wish to show reasons for assuming that the Walker collection is not now, in all its details, what it was before Mr. Butler took charge and merged my collection with it in 1883. And I insist that Walker's text must not conflict with the present "types" when we are called upon to identify the two. Perhaps, in the present case, Prof. Fernald has some additional information to that which he gathered for me and kindly communicated in 1879. At any rate, Prof. Fernald's published remarks (l. c.) should be read in the light of Prof. Smith's present references.

Lithophane unimoda, Lintner.—This may be a distinct species, but the single specimen I saw impressed me with the probability that it was only a dark, suffused form of one of the species of the *antennata* series.

Lithophane gausapata, Grt.—I believe the specimen was sent me by my friend Behrens. Why the type "should" be in Mr. Neumoegen's collection I do not know, except that I gave him all my material before leaving home. I believe he has it and also the type of *Mamestra ferrealis*, unless I gave it to some one else—Prof. Smith, perhaps.

Lithophane deposita, Morr.—The specimens in my collection, or, at least, one of them, came from Mr. Morrison, and are thus authentically named, if not "types." This same is true of *fagina* and *curvimacula* in my collection.

Digitized by Google

Lithophane oriunda, Grt.—If the "type" is not in British Museum, Prof. Saunders may have it. This species was, I believe, authentically determined by me for Mr. Geo. Norman, and his specimen may be in the British Museum.

Lithophane Bethunei, G. & R.—It is of little importance now, since the species is so well known, but I believe our type is in Philadelphia. Mr. Robinson gave our collection to the Central Park Museum, and Mr. Beutenmüller can probably testify as to what "types" of *Noctuidæ* it may contain. "Types," from which a figure was made, might lose their labels, and may not have been reclaimed by us.

Lithophane capax, G. & R.—I wish to mention this species because I took my own original material in 1867 with me to Vienna and showed it to Julius Lederer, the well-known European authority on the *Noctuidæ*, and asked his opinion on the generic location of the insect. He said of all the European genera the moth came nearest to *Xylina*. I have been of the opinion for a very long time that its position here was only tentative.

Euharveya carbonaria, Harvey.—When Dr. Harvey described this species, I very much doubted its reference to *Lithophane*. As I have lost the pleasure of naming a genus after him, through Mr. Walker's *Siavana*, I propose the present term for *carbonaria*, which Prof. Smith says affords a remarkable structural character. According to my view, the moth approached my genus *Ufeus*.

AGROTIS MURAENULA.

I am not prepared to admit, without further study, the validity of the generic disintegration of the species of *Agrotis*. It does not seem to me probable, for instance, that *occulta*, for which I retained *Eurois*, Hübn., should be congeneric with *pellucidalis*. But all such questions, together with the proper names according to the rules which these new groups must bear, may be left to the future monographist. They do not affect the present case, which is this, that two species, properly referred by me at the time to *Agrotis*, were described by Walker under the same specific name *vetusta*. One of these turns out to be, as I had suggested in my essay, *muraenula*, G. & R., and this latter name, I claim, under the custom and as accepted in Staudinger's Catalogue, should be retained for the species it designates, since at the time it was free to be named and no subsequent generic separation can overturn its real and conceded right at the time it was proposed. *Vetusta*, Walk., as applied to *muraenula*, must be relegated to the synonymy.

Digitized by Google

AGROTIS OPIPARA.

When Mr. Morrison described his *opipara* and *scropulana* from Mt. Washington, I was working out the theory with regard to the influence of the Glacial Epoch, or Epochs, upon the geographical distribution of to-day of our lepidoptera. It was a matter of less interest that Mr. Morrison should have redescribed known species, than that these species from Mt. Washington should have a representation also far away in the higher latitude of Labrador, or that Labrador forms should be demonstrated to occur also on mountain peaks in New Hampshire. Mr. Moeschler sent me specimens of his *islandica* and *carnea* from Labrador, and when Mr. Morrison also sent me his "types" of *opipara* and *scropulana* I compared them and found the two species from Mt. Washington the same as the two from Labrador. I exhibited all these specimens at the meeting of the Entomological Club of the American Association for the Advancement of Science, and there is record of the fact in the CAN. ENTOMOLOGIST. I adopted then Mr. Moeschler's names for these insects, having no opportunity to go behind his determination and suspecting no necessity. Matters rested in this way until I had the opportunity, when I found, and was the first to find, that the real *islandica*, Stdgr., from Iceland was probably different from *islandica*, Moeschl., from Labrador, as well as from *opipara*, Morr., from Mt. Washington; the two latter being, as I had originally claimed, the same species. Accordingly in 1882, in my New Check List, p. 25, I called our North American species *opipara*, Morr., with *islandica*, Moeschler, in error, as a synonym. I added this note :—"This species from Mount Washington is identical with the Labradorian species determined by Moeschler as *islandica*. But I have doubts, since seeing an Icelandic specimen, as to whether Moeschler is right. In restoring *opipara* for this species I do not in the slightest way change my opinion as to the identity of the Mount Washington and Labradorian species." Nothing can be clearer than my words and action. I was bound to accept Moeschler's authority in the first instance since I could not but believe he knew Staudinger's species and Mr. Morrison knew neither that nor *carnea*. Eight years later comes Prof. Smith and (although I never had, at any time or anywhere, described any North American species as *islandica*, and although, whenever I mentioned the name, it was perfectly clear I was speaking of the species identified by Moeschler) cites after *opipara*, "*islandica*, Grote, in error." Prof. Smith goes still further. He

Digitized by Google

suppresses my reference of the species described by Moeschler as *islandica* to *opipara*, in 1882, as cited above, and has the courage to write "the error is Mr. Grote's for condemning Mr. Morrison's species on insufficient grounds!" By also suppressing Moeschler's original determination, I am brought in for a synonym I never committed! In effect what I really did was this: I identified the two species described by Moeschler from Labrador and Morrison from Mt. Washington as the same, which was a clear scientific gain. I am also the first to show that Moeschler's name for the species was the result of a wrong identification, and that our North American species must be called *opipara*, Morr., with *islandica*, Moeschl., nec. Stdgr., as a synonym! In 1885, three years after my rectification, Mr. Smith writes (Ent. Am., I., 14,) that "Mr. Moeschler's claim that *islandica* is found in Labrador is based on a variety which is certainly the *opipara* of Mr. Morrison." Here was the place to say that I had made the correction and arrived at the conclusion in my note printed in 1882! I think I may say that I have been anxious that every real mistake I have made should be rectified for the sake of science and that I have never shunned a just criticism. But, in view of facts like the preceding, it will appear that an author may allow himself to publish a criticism the reverse of just and without any apology for his conduct.

PACHNOBIA CARNEA.

It is a matter of comparatively little consequence now whether Mr. Morrison redescribed *carnea* or the closely allied *Wockei* from Labrador. If the supposed "type" in Tepper coll. is alone genuine, he will have redescribed the latter; if the two (?) specimens he sent me at the time are genuine "types," he will, I think, have described *carnea*. In order to make out the former the true case, Prof. Smith omits Mt. Washington as locality for *carnea* in his Revision, and gives it only to *Wockei*. I do not feel sure the two are really different and am quite certain Morrison did not distinguish them. He sent me at the time to Buffalo a cigar box half full of specimens, all "types" of his *scropulana*, for my opinion. I wrote him they were very beautiful, but varied so much I could not believe well they were all one species. I was instructed to return them at once and did so without taking them out of their places, retaining only one or perhaps two of the dingiest specimens, which were specially marked for me, and which, on comparison, I identified with *carnea*. Now, long afterwards, and without knowledge of the facts, Prof. Smith appears and writes as if he knew all about Morrison's "types," pronounces a

Digitized by Google

single one in coll. Tepper as genuine, while conceding elsewhere that Mr. Morrison was very liberal in labelling specimens as "types." To conclude, in the Synonymic Catalogue the locality for *carnea*, Mount Washington, reappears! On whose authority if not on mine based on Morrison's specimens? What has happened between the Revision and the Catalogue? Has Prof. Smith seen my specimens sent by Morrison and found them really *carnea*? In the Synonymic Catalogue several of my *Agrotis* species are reinstated, and perhaps finally my determination of these two Alpine forms may gradually come to be acknowledged. Where an examination of my collection has resulted in establishing my determinations so very largely, it seems hardly worth while to pursue the subject further. There remain but a few cases of specific determination where I am still of a different opinion from the author of the Synonymic Catalogue, and I reserve my views on these until a proper time.

AGROTIS EXSERTISTIGMA.

This species was described by Mr. Morrison on material furnished by me and credited to me, and I figured, in the Buffalo Bulletin, the specimens returned as "types" of *Exsertistigma* by Mr. Morrison. But it appears that one of my specimens was not returned me, that this specimen, also marked as "type" of *exsertistigma*, found its way into Mr. Tepper's possession, and that this specimen belongs to a species afterwards described by me as *observabilis*. It may be truly said that Mr. Morrison's original description was totally inadequate, and that therefore the species should remain as figured and determined by myself. There is nothing to prove the Tepper specimen the genuine one, and mine not genuine. My publication was the only sufficient one. Probably, almost certainly, Mr. Morrison considered them all the same, in which case my determination was decisive. If Mr. Morrison considered my specimens credited to me and Mr. Tepper's one species, I was free to determine one as *exsertistigma* and re-describe the other (of the existence of which in Mr. Tepper's collection I was, however, ignorant). I think, with justice, my original determination should prevail. But my original determinations have been overturned by Prof. Smith; only this author has overlooked the fact that his new name for my *exsertistigma*, viz., *confusa*, must fall before *Morrisonistigma*, proposed by me in Buff. Bulletin.

THYATIRA ANTICOSTIENSIS.

I would draw attention to the fact that this form of *T. pudens*, Guen., taken by Mr. Wm. Couper on Anticosti, is described by me, CAN. ENT.,

Digitized by Google

XVIII., 215, 1886. My specimen is, I believe, now in the British Museum, and, I think, unlabelled. It is apparently a hoary, boreal form of *pudens*, but may also be restricted to Anticosti. I have not had sufficient material to decide the question.

SPHIDA OBLIQUA, Walk.

Prof. Smith has shown that my identification of our *S. obliquata* with this species of Walker's is correct, and the species must be known as above. I separate *Sphida* from *Arzama*, or, as it must be now known, *Bellura*, on account of the clypeal tubercle, exactly as *Ochria*, Hübn., (=Gortyna, Auct.,) is separable from *Gortyna*, Hübn., (=*Hydræcia*, Auct.) As I use an acknowledged generic character, I do not see why it should here fail of recognition. In some way, now incomprehensible to me, I failed to see Walker's species in 1867, when I was there with a specimen to identify. The drawer may have been overlooked, or the species not then in place—probably the latter, as Mr. Walker was then employed in arranging the material. I saw then the type only of *Arzama densa*, and recognized it at once as allied to our species of Sphida. I did not then know *vulnifica*, which I described in 1872 in Philadelphia. I left my type there and there it must yet be. The type of *densa* did not recall to me *vulnifica*, which is more yellow; I have all along thought these were two species; one "reddish," smaller perhaps, *densa*, and another, *vulnifica*, differently coloured. Of this latter I regarded *melanopyga* as a variety with blackish anal tuft. I did not see the type of *Bellura gortynoides*, Walk., C. B. M., 32, 465; the description more resembles *vulnifica* than that of *densa* does. As I have not seen my type of *vulnifica* to compare with my material or with *melanopyga*, it should be found and studied. I have now myself no, or little doubt, we have to do with a single variable reddish on yellow species, and that Prof. Smith's synonomy will be found to be correct, p. 181, where the name is mispelled *gortynides*. (Other cases of miswritten names are: *tranquila*, for *tranquilla; synochites*, for *synochitis; appasionata*, for *appassionata*, etc.) From this variable brighter coloured species, *Bellura diffusa*, Grt., is totally distinct. It has been collected by Mr. Moffat, I believe, in Canada. Where my type is now I cannot for the moment recollect. It seems not to be in the British Museum. A type of *Sphida obliquata* is or was in the Central Park Museum. The *Arzaminæ*, then, are a group of noctuid genera with aquatic larvæ, having affinities with *Nonagria* and of a peculiar Bombycid appearance, owing to the tufted female abdo-

Digitized by Google

men, like *Lasiocampa*, *Ocneria*, *Bombyx*, etc., and soft brown colours. They are exclusively American and seem to be the survival of an ancient form of the family. The two genera may thus be catalogued :

BELLURA, Walk.

GORTYNOIDES, Walk.
densa, Walk.
vulnifica, Grt.
var. melanopyga, Grt.

DIFFUSA, Grt. — SPHIDA, Grt.

OBLIQUA, Walk.
Obliquata, G. & R.

A TERATOLOGICAL TRIO.

BY W. HAGUE HARRINGTON, OTTAWA.

For those interested in teratology I wish to record three instances of malformations of the antennæ of Coleoptera. The beetles presenting these have been kindly given to me by Mr. W. Simpson, an energetic and observant young collector of this city. The deformities exhibited are as follows :—

Fig. 6—*a*. Right antenna of a male *Dytiscus Harrisii*, in which the third joint is enlarged and broadened toward the tip and gives off two branches. The inner of these contains eight joints and is quite normal in appearance, but the outer consists of only two articles, of which the second is short and irregular at apex, and does not seem to have had any more attached to it.

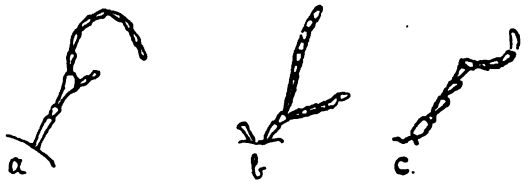


FIG. 6.

b. Right antenna of *Adimonia cavicollis*, in which the second joint is somewhat enlarged and gives off two branches. The inner branch consists of the full nine joints necessary to complete the organ, but these joints are all slightly shortened and broadened, and the branch has a subclavate appearance. The outer branch is imperfeet; the first four joints are still more shortened, and are succeeded by two irregular articles, the first of which evidently represents at least two.

c. Right antenna of *Desmocerus palliatus*, in which the sixth joint is represented by a small wedge-shaped piece. The seventh is short and thickened, and is set at right angles to the fifth, thus making a sudden bend in the antenna. This malformation is probably due to an injury while the insect was in the pupa state, as indicated by fragments of skin which remained when the beetle moulted.

Digitized by Google

COCCINELLIDÆ OF DODGE CO., WISCONSIN.

BY WILL EDWIN SNYDER, BEAVER DAM, WIS.

Anisosticta strigata, Thunb. Very abundant, found under stones, bark and other objects in nearly all pasture and meadow lands. I have never taken it while feeding. A colony of over fifty was taken from under one stone the past summer.

Megilla maculata, D. G. Abundant—to be found nearly everywhere. Most abundant in the late fall in corn fields infested with the chinch bug. One of our earliest beetles to appear in the spring. Also to be taken during warm spells in midwinter, seven specimens having been taken on the eighteenth of January of the present year.

Hippodamia glacialis, Fab. I have two of this species taken from under bark of a stump in 1891. It is the only record I have of its occurrence here.

Hippodamia 13-punctata, Linn. Our most abundant species of the Coccinellidæ. Especially abundant in corn fields in company with *M. maculata*, *H. parenthesis* and *C. sanguinea*. Varies much in colour and markings. Doubtless very destructive to the chinch-bug, as it occurs most frequently in fields infested by it.

Hippodamia parenthesis, Say. Common, especially so among the loose bark and rotted wood on old oak stumps.

Coccinella 9-notata, Hbst. Abundant, most so early in the spring, when large quantities can be taken from under stones and other material lying in pastures. Varies in colour and markings.

Coccinella sanguinea, Linn. Not so abundant as *C. 9-notata*. Found in largest numbers in oat fields just before harvest.

Anatis 15-punctata, Oliv. Abundant, found feeding upon the leaves of various shrubs. Noticeable here from the fact it is seldom found in the interior of timber lands, preferring the vegetation along the borders, especially on the north side. Larvæ and pupæ always to be found if an adult can be.

Psyllobora 20-maculata, Say. I have three specimens in my cabinet, all being found under stones in a pasture, two taken in 1892 and one in 1893.

Chilocorus bivulnerus, Muls. The "twice stabbed lady bug" cannot be called common here. During five years I have not taken more than 25 specimens.

Digitized by Google

Hyperaspys undulata, Say. Occasionally taken, though it can hardly be classed as common.

Scymnus analis. I have three specimens in my cabinet which Dr. Riley identified as *analis.*

In conclusion, I wish to thank Dr. Riley for his valued assistance in naming the above species.

CORRESPONDENCE.

WINTER HABITS OF SOME COLORADO PROCTOTRYPIDÆ.

Sir,—In the review of Mr. Ashmead's work on the Proctotrypidæ in the last number of this paper, a method for obtaining some of the species in winter was mentioned. During a winter's collecting, mostly beneath stones, boards, etc., I have found the following species (determined by Mr. Ashmead) occurring quite frequently:—*Pantoclis montana*, Ashm. *Pantoclis coloradensis*, Ashm., *Tropidopria torquata*, Prov., *Tropidopria simulans*, Ashm., *Tropidopria*, sp., and *Aclista*, sp. In some localities the species first mentioned occurs quite abundantly.

CARL F. BAKER, Fort Collins, Colo.

CONCERNING CALOTARSA ORNATIPES, TOWNSEND.

Sir,—In the February number of the CAN. ENT, Prof. Townsend described and figured a peculiar fly under the above name. The figure of the hind tarsus at once reminded me of a fly I had collected some years ago at Ithaca, N. Y., and on comparing find that it is a specimen of *Calotarsa ornatipes.* But I had not considered the fly as a Syrphid, as its characters are opposed to almost everything of important value in the Syrphidæ. Not only in the absence of a spurious vein and the open first posterior cell, as mentioned by Prof. Townsend, but in the small basal cells, the presence of several prominent macrochætæ on the thorax, and the terminal *arista* to antenna. Some Syrphidæ have a terminal *style*, but an *arista* is different. Moreover, the origin of the anterior veins of the wings is unlike that of the Syrphidæ. Besides there are spurs at the tips of the intermediate tibiæ.

I am not a Dipterologist; but my specimen is labelled "Platypeza," which, I think, is correct. In this position the fly is not so anomalous and remarkable as when placed in the Syrphidæ. NATHAN BANKS.

Mailed March 13th.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, APRIL, 1894. No. 4.

NEW NORTH AMERICAN HOMOPTERA.—NO. VII.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

1. IDIOCERUS AMŒMUS, *n. sp.*

Allied to *I. suturalis*, but smaller. Female of a uniform pale yellow colour, pronotum and scutellum tin gedwith fulvous or ferruginous, the former with a spot behind the inner angle of each eye and a median vitta, pale. Mesonotum with a black band bordering the scutellum, at least posteriorly; extreme tip of scutellum yellow. Elytra hyaline very slightly tinged with fulvous, becoming smoky toward the apex; nervures pale yellow. Wings hyaline, highly iridescent. Eyes rufous. Oviduct ferruginous.

In this species the front is more strongly narrowed apically with the sides nearly rectilinear beyond the antennæ, not so distinctly arcuated as in *I. suturalis*; and the clypeus is less expanded at apex. The last ventral segment is very feebly rounded behind, not distinctly advanced at the middle as in *suturalis*. In one example the pronotal markings are obsolete and the oviduct pale. Length, 5 mm.

Described from two female examples. One taken near Los Angeles Cal., by Mr. D. W. Coquillett. The other, a more deeply coloured specimen, was sent me by Mr. C. P. Gillette, as an inhabitant of the mountains of northern Colorado. Mr. Coquillett's specimen came labelled *Idiocerus amœmus*, Uhler., a M.S. name which is quite appropriate to this pretty insect.

2. PEDIOPSIS SORDIDA, *n. sp.*

Closely allied to *P. tristis*, but smaller. Male: Greenish grey, closely and coarsely punctured with blackish; punctures on the face irregularly disposed; those of the pronotum deep, elongated and oblique, but rather less conspicuous than in *insignis* and *tristis;* median line distinct. Scutellum pale with the basal angles commonly fuscous. Elytra deep smoky-brown; nervures strong, concolorous. Abdo-

Digitized by Google

men, breast and legs piceous-brown; the knees, outer edges of the tibiæ, broad hind margins of the ventral segments and valve, and the base of the plates, whitish. In pale examples the legs are fulvous and the venter and plates almost uniformly ashen-grey. Length, 4 mm.

Female: Larger. Grey tinged with fulvous-yellow. Elytra concolorous, subhyaline, with inconspicuous nervures, and with the head, pronotum and scutellum irregularly mottled with brown; the basal angles of the latter blackish; punctures concolorous and less distinct than in the male. Legs and all beneath brown, the outer surface of the femora and the tibiæ more or less invaded with fulvous; the abdominal segments and genital pieces broadly margined with whitish; or the lower surface may be entirely pale yellow with no trace of the brown markings. Length, 5 mm.

Colorado. Described from two male and five female examples collected among the Rocky Mountains by Prof. C. P. Gillette. This sombre species seems to be very unstable in its colouring, varying from a uniform pale yellow beneath to deep brown banded and marked with whitish. The females are well distinguished by a peculiar dusky mottled appearance above and the evenly punctured head; and the dusky basal angles of the scutellum in both sexes.

3. AGALLIA CONSTRICTA, *n. sp.*

Closely allied to *A. 4-punctata*, Prov., but smaller and more slender. Length, 3–3½ mm.

This species can best be characterized by a comparison with *4-punctata*. Female: Face a little more elongated than in that species; the front more gradually narrowed to the apex and not so broad at the base of the clypeus; clypeus more narrow and slender; outer edge of the cheek less deeply excavated under the eye, the edge between the eye and outer angle shorter, and the angle less prominent. Pronotum proportionately longer, with the latero-posterior margin distinctly longer and the posterior angles more prominent. Elytra narrower, especially toward the apex, the costa not so strongly arcuated, the apical areoles longer and narrower. Last ventral segment more produced and narrower behind, outer angles much depressed against the base of the pygofers, subtectiform, with a triangular flat basal area. In *4-punctata* there is a small oval depression on either side scarcely invading the basal half of the segment and leaving a central ridge and usually the apical margin

Digitized by Google

elevated. Pygofers shorter than in *4-punctata* and scarcely exceeded by the oviduct which in its ally is distinctly longer. In the male the front is as strongly constricted below the antennæ as in the female, while in *4-punctata* the constriction is very slight; and the outer angles of the cheeks in the male *constricta* are almost obsolete. Plates more slender than in *4-punctata*, triangular at base, narrow and parallel beyond with their rounded apex not attaining the tip of the pygofers.

Colour and markings substantially as in *4-punctata:* Yellowish testaceous, marked and clouded with fuscous. Sutures of the face, apical disc of the clypeus, an oval mark on the front, a longitudinal line from the basal angle of the front continued over the vertex and to the apex of the scutellum, four spots on the pronotum—two near the apex, and two at the humeral angles—a dot on the vertex against the eye and another on each ocellus, fuscous-brown. Two round spots on the vertex, two more on the disc of the pronotum posteriorly, and the antennal pits, black. Pectoral pieces and legs more or less clouded with brown. Elytra fuscous with pale nervures. Abdomen more or less fuscous or even black in some males, the genital pieces pale.

The colours are paler in the females. Sometimes the fuscous markings are almost obsolete above, but the four black spots on the vertex and pronotum seem to be constant.

New Jersey, Mississippi, Florida. Described from numerous examples received from Mr. Howard Evarts Weed, Prof. J. B. Smith, and others. This appears to be a common species in the Southern States, where it replaces *A. 4-punctata.*

4. AGALLIA UHLERI, *n. sp.*

Allied to *sanguinolenta* but more slender. Pale greyish-brown tinged with yellow, especially beneath. Two round dots on the vertex, the basal angles of the scutellum and two oblique marks on its apical field, sometimes continued forward as an interrupted median line, a cloud on the pectoral pieces, the tergum, its margins excepted, and sometimes the base of the vertex, black. Front brown, with pale lateral arcs, or pale with brown arcs. Elytra subhyaline, with distinct brown nervures. Front a little longer and narrower than in *sanguinolenta*. Last ventral segment of the female deeply and widely cleft, the lateral lobes rounded. Genital characters of the male about as in *sanguinolenta*. In deeply-coloured specimens the pronotum shows four longitudinal vittæ, the apex of the

Digitized by Google

head has a brown cloud, the ocelli are rufous and some of the elytral nervures are broadly interrupted with white. Length, about 3 mm.

Colorado, Arizona, California. Described from ten examples representing both sexes. This plain little insect I have received from several correspondents labelled *Agallia venata*, Uhl., and *Agallia enervis*, Uhl., and two highly-coloured examples from California came with the name *Agallia longula*, Uhl. The Californian material was received from Mr. Coquillett; those from Arizona were from the Morrison Collection, and the specimens from Colorado I owe to the kindness of Prof. C. P. Gillette.

Mr. Uhler's M. S. name, *venata*, would be appropriate for this species, but it is too near the European *venosa*. The other names, *enervis* and *longula*, are inapplicable to the more typical examples, so I have taken the liberty of applying to it the name of the well-known scientist who first recognized the species.

5. THAMNOTETTIX ATRIDORSUM, *n. sp.*

Allied to *Th. inornata*. Female: Pale yellow, washed with green above, especially on the pronotum and elytra. Beneath tawny yellow, or whitish on the venter; disc of the tergum, at least basally, the metasternum and basal segment of the venter commonly, tip of the rostrum, sides of the oviduct and two spots, sometimes coalescing, on the middle of the apical margin of the last ventral segment, black. Elytra subhyaline, a little smoky at apex, in some examples quite strongly washed with greenish; nervures strong, greenish. Wings hyaline, iridescent. Vertex produced and quite strongly angled before, length at the middle twice that next the eye and nearly equal to that of the pronotum; median impressed line distinct to beyond the middle. Front rather broad, showing about six pale brown arcs above. Clypeus scarcely widened toward the rounded apex, sides rectilinear. Cheeks obtusely angled, and longitudinally wrinkled externally. Eyes and antennal setæ pale brown. Sides of the pronotum short, carinate. Last ventral segment long and narrow, sides regularly arcuated from the truncated apex to the base. Length, 4½ mm.

Colorado. Described from three female specimens received from Prof. C. P. Gillette. This species is proportionately broader and shorter than *Th. inornata*, the pronotum is shorter and more concave behind and

Digitized by Google

the elytra are shorter and their nervures stronger than in that species.

Two larger individuals (6 mm. in length), apparently not distinct from the above, are broader with a wider front and a shorter and more obtuse vertex. They are both females.

6. ATHYSANUS SEXVITTATUS, *n. sp.*

Form of *A. comma* nearly. Greyish, tinged with yellow, especially on the head. Vertex with the impressed median line brown; marked either side on the disc with transverse oblong brown spots; apex polished, pale yellow with an elongated black mark on either side reaching over on to the base of the front; ocelli pale with a blackish dash on either side. Pronotum with six longitudinal brown vittæ and a few irregular marks before. Scutellum with two discal dots, two basal spots, and sometimes a double cloud on the apical field, brown. Elytral areoles edged with fuscous; nervures thick, soiled white. Front brown, its broad base and a few broken arcs pale; sutures of the loræ brown. Tergum black at base, the sides and about four apical segments pale, the latter with two broad obscure longitudinal brown vittæ terminating in a black spot either side on the large polished yellowish genital segment, or these vittæ may become geminate by the intrusion of a longitudinal pale line; sides of these pale apical segments with a row of black dots. Venter and disc of the valve dark brown; connexivum, hind edge of the ultimate segment, edge of the valve, plates and pygofers, soiled yellow or clouded with dusky; the pygofers with a large blackish cloud beneath toward their apex. Anterior and intermediate femora twice banded, and the posterior lineated with brown; tibiæ with brown dots. Vertex flat, edge subacute; length on the middle one-third greater than that next the eye. Front regularly narrowed to the apex. Clypeus not widened apically. Pronotum short, hind edge nearly straight, anterior edge feebly rounded. Elytra short ovate, reaching to the penultimate dorsal segment. Valve rather large, obtuse at apex; plates oblong, widened at base, their apex truncated; pygofers large, blunt at apex, surpassing the plates. Length, 3½ mm.

Colorado. Described from two males received from Prof. C. P. Gillette. This species is most nearly allied to *A. comma* in most of its characters, but it has the colours and markings, almost, of *obsoletus* and *extrusus*. Only males are known to me.

Digitized by Google

THE LIFE HISTORY OF RIVULA PROPINQUALIS, GN.

BY E. PORTER FELT, B. S., FORT PLAIN, N. Y.

This rather common moth seems to have attracted little attention, though the larvæ are voracious feeders. The moths may be seen flying over grass lands in the afternoon and early evening during June, July and August. They are attracted to lights but very little, only a few being taken in the trap-lanterns at* Ithaca, N. Y., in 1889.

The moths deposit their eggs singly, or in scattered clusters of five or six. The eggs are a pale straw colour, and are firmly attached to blades of grass. This insect does not appear to be very prolific: out of seven or eight females under observation, none laid over fifteen or twenty eggs and most of them laid only eight or ten.

The eggs hatch in about five days. The larvæ escape from the egg by eating nearly around the upper surface of the shell and pushing up the lid thus formed. (Fig. 7.)

FIG. 7.—Lateral and top view of egg; the latter showing the micropyle and the lid that the larva forms as it makes its way out of the egg. Greatly enlarged.

The remains of the shell are not molested. When first hatched the larvæ are a pale yellowish colour and with long fuzzy hairs on the back; the hairs are longer at the extremities and incline well over the head. The young larvæ begin feeding at once and soon they are a bright green colour. When not feeding the larvæ remain quietly upon the surface of the leaf. In this position they harmonize so well with their surroundings that it is difficult to detect them, even when in plain sight. Frequently the best way to find them is to look for injuries to the grass. When very young the larvæ feed upon the upper surface of the leaf, eating only the soft parenchyma of the leaf. When about two weeks old they greedily devour the whole leaf. Besides eating considerable, the larvæ also waste much by cutting leaves off as they feed. The larvæ rarely move except in search of food unless disturbed, when they usually drop to the ground.

Larvæ coming from eggs laid in August moult three times before hibernating. When cold weather approaches the larvæ crawl down near the

* The work upon which this paper is based was done at the Insectary of Cornell University.

Digitized by Google

base of a grass stalk and remain quiet till the warmth of spring arouses them. After their long exposure and fast, their colours are perceptibly duller and the body is much shrunken. The larvæ soon regain their normal size and colouring. In the spring there are at least two moults. The larvæ pupate the latter part of June. The pupa state lasts about five days. The pupæ are bright green, striped with white. They lie in loose white cocoons, which are attached to blades of grass.

The moths that emerged the latter part of June laid eggs. The larvæ from these eggs completed their growth about July 13, and July 20 a second generation of moths emerged, the round of life being completed in thirty days. It is probable that a third generation occurs in the month of August. At least it is possible and in harmony with what is known, because the moths are quite common in August, and there is no evidence to show that the moths live more than two weeks.

Egg.—A pale straw colour; form an oblate spheroid; short diameter, .36 mm.; long diameter, .42 mm. There are numerous ridges; micropyle complex. (Fig. 7.)

Larva, first stage.—Head diameter, .2625 mm.; body diameter, .1875 mm.; length, .9375 mm. Head cream coloured; body a pale yellow. There are several rows of minute tubercles on the body, and from each tubercle a light-coloured hair grows. The hairs are longer at the extremities of the body, and give the larvæ a fuzzy appearance. There are five pairs of prolegs, occurring on the seventh to tenth and thirteenth segments inclusive.

Larva, second stage.—Head diameter, .3875 mm. The body is more hairy and the colour a deeper green.

Larva, third stage.—Head diameter, .6875 mm. The body is a bright green, and the hairs are relatively shorter than in the preceding.

Larva, fourth stage.—Head diameter, .849 mm. The larva has two prominent dorso-lateral ridges, which are marked with white stripes.

Larva, fifth stage.—Head diameter, 1.2 mm. Markings the same as in the preceding.

Larva, sixth stage—Head diameter, 1.8 mm. The larva has two narrow creamy-white subdorsal stripes in place of one broad one; hairs dark coloured.

Digitized by Google

Pupa.—Length, 9 mm. Colour bright green with two white stripes on the dorsum, extending from the head to the tip of the abdomen.

Cocoon.—Very thin, loose and white.

NOTES ON THE LIFE HISTORY OF ARGYRIA NIVALIS, DRURY

BY E. PORTER FELT, B. S., FORT PLAIN, N. Y.

This moth was rather common at Ithaca, New York, in 1892 and 1893. The moths fly in the afternoon and early evening of the latter part of June and most of July. They are attracted to lights to some extent, but those taken are mostly males. The eggs are laid in clusters upon blades of grass. They are firmly attached to the leaf, and the five or six in a cluster over-lap more or less.

The eggs hatch in ten or twelve days. The young larvæ were placed in a cage containing grass, clover and considerable moss. They soon disappeared, and subsequent observation proved they had constructed cylindrical nests in the moss. The nests were composed of bits of moss and were smoothly lined with silk. Some of the nests were perpendicular, others were horizontal. The larvæ devoured all the moss before any perceptible amount of grass was eaten. After the grass was eaten they began on the clover, and soon not a green thing was left in the cage.

When about a month old the larvæ are 2. cm. long, and their nests are three to four centimetres long. At this time the nests are mostly above the surface of the ground. There seem to be no indications of more than one generation a year. They probably hibernate in their nests as larvæ, and in the spring complete the round of life much as do some species of *Crambus*.

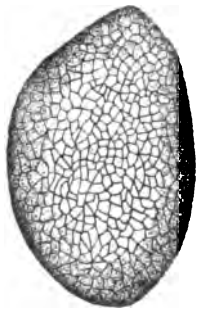


FIG. 9—Egg and micropyle. Greatly enlarged.

Egg.—Yellowish-white, flattened, oval, 1.2 mm. by .87 mm. Shell finely reticulated. (Fig. 8.)

Larva, first stage.—Head diameter, .33 mm.; body diameter, .27 mm.; length, 1.65 mm. Head and thoracic shield jet black. Body a straw colour with a broad transverse carmine stripe on the fifth and seventh segments. Spots of the same colour occur on the eleventh and twelfth segments, and also just above each pair of legs. Five pairs of prolegs, occurring on the seventh to tenth and thirteenth segments inclusive.

Digitized by Google

PREPARATORY STAGES OF CATOCALA RETECTA, GROTE.

BY G. H. FRENCH, CARBONDALE, ILL.

Egg.—Diameter, .035 inch by .02 inch high. Low conoidal, so much flattened as to be somewhat lens shaped, ribbed longitudinally with 37 striæ, 18 of which reach the micropyle, the striæ marked transversely with shallow cross striæ. Colour, dull olive. Duration of this period, 221 days.

Young larva.—Length, .13 inch. Of the usual shape, that is cylindrical with the head broader than the body, and the first two pairs of prolegs short and not used in walking. Pale-yellow or brownish-yellow, the anterior part of the body darker than the posterior, head and top of joint 2 dark brown. Duration of this period, 5 days.

After first moult.—Length, .20 inch. Same shape as before. Head and a small place on the top of joint 2 black. Body pale dull-green; three reddish purple stripes or lines on each side; piliferous spots small, a short gray hair from each one. Duration of this period, 6 days.

After second moult.—Length, .35 inch. Body striped with alternate stripes of white and purplish-black, three white lines on each side outside of the dorsal stripe, this stripe being made up of a narrow line each side of a more or less clearly defined blackish centre. The white on the sides in lines about a third as wide as the dark, all greenish tinged. Head black, with no markings unless it be indistinct mottlings at the upper part; piliferous spots small, black; venter sordid white with black spot in the centre of each joint. Duration of this period, 8 days.

After third moult.—Length, .65 inch. Of the usual shape, a slight fringe on each side. Colour dark; three stripes on each side and one dorsal, made up of two black lines enclosing a pale centre that is composed of a pale lilac-gray line with a central broken black line, the dorsal line containing very little of the central black; the stripes separated from each other by a narrow light stripe that is slightly creamy, with a little pale lilac mottlings in places, the light stripe lighter than the light lines in the dark stripes; a stigmatal stripe that is made up of the ground colour of the venter mottled with black, though not heavily; venter sordid white with a black patch in the centre of each joint; lateral fringe white, not very heavy; head black, with a few whitish lines that do not reach the apex, some of them broken; legs pale, mostly pale reddish, the anal and last prolegs darkest. Duration of this period, 5 days.

Digitized by Google

After fourth moult.—Length, .85 inch. Marked and striped as before, but the lines broken into dots, and the light a pale green in the pale stripes and a pale greenish-lilac in the darker stripes; head with no green; joints 2 and 13 with very little green; fringe more copious, about 15 to each joint on each side; head about as before; piliferous spots pale orange, the posterior pair of dorsals to each joint more or less black, these on the posterior part of the body wholly black, while on the anterior part of the body only a part of each spot black; the lateral spots similar. Duration of this period, 6 days.

After fifth moult.—Length, 1.25 inches. Striped with dorsal, suprastigmatal and substigmatal pale, and subdorsal and stigmatal dark stripes, the ground colour a pale whitish with a slight greenish tinge; the dorsal stripe is made up of two broken purplish-black lines that make a series of ellipses, the whole stripe making from one to two ellipses on each joint, and in these ellipses there is a broken line of purplish-gray outside the general black line; the separation between the stripes is a broken purplish-black line, that is much broken into dots in pale examples and less so in dark ones. The make up of the suprastigmatal stripe is two dark broken lines alternating with three broken pale ones, this scarcely distinguishable in the paler forms; piliferous spots orange, a brown hair from each; head striped with black and sordid white; venter white, with black patch on each joint. Duration of this period, 6 days.

After sixth moult.—Lenth, 1.90 inches. Ground colour pale green, rather dull, with a slightly pinkish tinge over joints 5 to 8 and the anterior half of 9 and a little over 11 to 12. General colour rather a dark gray; stigmatal and subdorsal stripes and the central part of the dorsal mottled with black, with broken black bordering lines, the black in dots and elongated dots that easily group into rows; central part of suprastigmatal like the dorsal only not quite so distinct black, each with a row outside the central black of dull reddish that is between a reddish-brown and purplish-red; substigmatal stripe with a dark lower part and a paler upper part containing its reddish line; joints 2 to 4 and posterior part of 9 and anterior part of 10 with all the mottlings black, so that these parts are darker than the rest of the body, especially is this the case with joints 9 and 10; posterior part of joint 12 slightly elevated; piliferous spots, dorsal and part of upper row of lateral red with whitish tips, the others mostly whitish with a little red at base; head with a black stripe

Digitized by Google

from above the antennæ and eyes one each side to the apex where it is a little more purple, mottled slightly with whitish, the rest of head dull dark lilac with whitish stripes that are as usual moniliform, with a dull purplish-orange stripe across these on the apex; venter white with a black patch in each joint; fringe rather copious, whitish with a faint lilac tint. These characters will answer for the mature larva, with the addition that at the time of pupating it was 2.50 inches long. Duration of this period, 21 days.

Chrysalis.—This is of the usual shape of the genus. Length, 1.10 inches; diameter, .34 inch; length from head to end of wing and tongue case, .70 inch, these extending to posterior part of joint 5; cremaster slender, ending in two small hooks, with a few more small ones at the base. Colour chestnut-brown, covered with a white powder. Duration of this period, 28 days.

The eggs were obtained September 11, 1892, from a moth in confinement, one of the darkest of the forms of Retecta.* Two were carried through to the imago state and produced moths that were not so dark as the parent, though not quite so light as some of the lightest forms, about half way between *Retecta*, as Mr. Hulst describes it in Buffalo Bulletin, vol. 7, page 53, and his *Luctuosa*. In CAN. ENT., vol. 24, page 19, I have referred to these two forms, stating that I regarded them as only one species from my observations of them in the field. My raising intergrades from the dark form shows that they are identical. The fact is the early fresh specimens are a combination of the light form and intergrades with some dark forms, while later as they become worn the dark forms predominate. I want to say again that *Flebilis* is not a variety of *Retecta*, but a smaller species and an insect of different habits from *Retecta*, although feeding on the same food-plant. I have taken hundreds of them and have never seen one grading towards *Retecta*. In fact it is one of our most constant species.

The total period of the preparatory stages of *Retecta* were 306 days, but this would of course vary with the deposition of eggs of different examples in the woods. The food-plant is hickory. The one described through its changes emerged July 22, 1893. My field notes record the capture of *Retecta* in 1892 from August 5th to September 24th, which will give a fair range of its appearance here.

Digitized by Google

NOTES ON PIERIS AND ANTHOCHARIS.

BY HARRISON G. DYAR, NEW YORK.

After reading Mr. J. W. Tutt's note on page 47 of CAN. ENT., I have looked over many of our species of Pieris and Anthocharis with the following result:—Our genus Pieris is probably entirely pure and congeneric with the European. The majority of our species of Anthocharis are congeneric with *Euchloë cardamines*, as figured by Mr. Tutt, but some species are different and should be removed from the genus. I have not examined seven of the species given in Prof. Smith's list, but those which I have seen separate in synoptic form as follows:—Mr. Tutt's nomenclature of the veins differs from that in use here, as will be seen by a comparison of my figures (Figures 9 and 10) of *Anthocharis sara* with the figures on page 47 of CAN. ENT.

§1. *Fore-wings with 11 veins.*

Veins 6 to 8 on a stalk; vein 9 absent; veins 10 and 11 arising from discal cell.

Vein 8 very short—nearly absent.

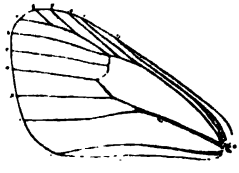


FIG. 9.

Pieris monuste, *P. beckerii*, *P. sisymbri*, *P. occidentalis*, *P. protodice*, *P. napi* vars. *hulda*, *oleracea* and *venosa*, *P. rapæ*, *Nathalis iole*.

Vein 8 moderately long.

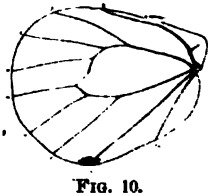


FIG. 10.

Neophasia menapia, *Tachyris ilaire*.

Anthocharis lanceolata, *A. cethura*.

Veins 6–10 on a stalk; vein 9 absent; vein 11 from discal cell.

Anthocharis genutia.

§2 *Fore-wings with 12 veins.*

Veins 6–10 on a stalk; vein 11 from cell.

Anthocharis ausonides, *A. olympia*.

A. coloradensis, *A. hyantis*, *A. creusa* [1].

Veins 6–9 on a stalk; veins 10 and 11 from cell.

Anthocharis creusa [2], *A. sara*, *A. julia*, *A. Morrisoni*, *A. stella*.

Digitized by Google

NOTES ON PARNASSIUS CLODIUS.

BY JOHN B. LEMBERT, YO SEMITE, CALA.

After a journey of ten miles over snow and snowbanks from four to eight feet deep, I arrived in the latter part of June, on my summer and fall collecting ground on the Fuolumne Meadows, which lie on the edge of the area wherein the high Sierra species of Lepidoptera are most numerous. The *Parnassius* was one of the first I began to collect, as the butterflies had just commenced to issue, and were flying in the grassy and shaded timber-covered portions of a rocky side hill slope. After they were out a day or so they began to settle down on flowers to feed, and were then less difficult to catch. The first day I only caught three, and kept on adding a few more to that number every day. Towards three and four p. m. they camp for the night on low bushes and a low growing sedge (Carex filifolia) and rise only when disturbed by ants or the collector on his return towards camp. I have in this way taken a great many females. On the 6th of July a ♀ after a hard chase up a rocky elevation lit on the sand and walked upon a Phlox cæspitosa and deposited an egg; she then flew to another and deposited an egg there also. I dug up both plants and put them in a box, placing the insect in same box, but when I got to camp she was missing. On July 10th I secured an egg that a ♀ laid on Carex filifolia. The same ♀ attempted to oviposit on so slender a plant of *Gayophytum diffusum* that it bent backwards down on the ground, which caused her to fly on others with the same result. Shortly after I saw several ♀'s do the same thing. One female being driven into a bush by a ♂, as soon as he left, she flew in a direct line to a large boulder, and tacked an egg on its side. I marked the spot and secured the egg, only to be crushed before I got home the next day, and the one on the carex was also lost. Towards the latter part of July a ♀ took to ovipositing on the Pinus Murrayana burrs lying on the ground, and then on carex. Not being able to find the eggs on the burrs, I threw them away. Not long after another ♀ did the same thing, and finally alighted on a piece of rotten wood. After she flew away these burrs gave the same results as the preceding ones, and on the rotten wood I could see nothing but a small crevice; but on breaking the crevice open I found the egg. This unravelled the mystery why I could not find the eggs on the pine burrs.

Digitized by Google

NOTE ON THE PROPOSED NEW GENUS CALOTARSA.

BY C. H. TYLER TOWNSEND, JAMAICA, W. I.

On pp. 50–52 of the present volume of this journal, I described the new genus and species *Calotarsa ornatipes*, which I then supposed to be an anomalous syrphid. I am now convinced that it is a platypezid. At the time of writing the paper, which was sent in in the fall of 1892, I overlooked the ciliate alulae of the wings, the apical spur of middle tibiæ, and the similarity of venation with the Platypezidæ.

I was led to place it in the Syrphidæ from its extreme resemblance in structure and coloration to that family, the only venational character in which it was actually aberrant being the open apical cell. There is no doubt now, however, of its true position. Credit is due to Mr. Coquillett for suggesting to me *in litt.* its affinities with the genus *Platypeza*, to which he referred it, at the same time raising the question as to whether it could be possible that the peculiar tarsal appendages were of extraneous vegetable origin. I am very certain that the appendages of the hind tarsi are not of extraneous origin. They are exactly similar to each other on both the right and left tarsi. As to the validity of the genus, it is, barring the neuration, quite as unique as before supposed. It is much larger than any known Platypezidæ, which range from 1½ to 3 mm., or at most 4 mm., and its colouring is quite different from what is usual in that family. It does not agree in the structure of its hind legs with *Platypeza*, to which genus it most nearly approaches in venation. In *Platypeza* the femora, tibiæ, and tarsi are evenly widened and thickened in the hind legs. In *Calotarsa* the hind femora and tibiæ are hardly at all widened or thickened, while the tarsi are greatly widened, flattened and winged. It is also removed from *Platypeza* s. str. in certain neurational and antennal characters, for which see description, and in the prominent hypopygium. It may be looked upon as a gradation between the two closely related families, the Syrphidæ and the Platypezidæ, clearly located in the latter but with a leaning in the direction of the Pelecocerini tribe of the former.

NOTE.—Since writing the above, Prof. J. M. Aldrich has sent me drawings of the tarsi and wing of a similar species of *Calotarsa*, which he caught on a window at Brookings, So. Dakota. The specimen is a male, and less than 5 mm. long. From the drawings I believe it to be a distinct species. The venation is quite the same, except that the posterior branch of fourth vein does not quite reach the wing margin, which I am inclined

Digitized by Google

to consider a good specific character, following Schiner as Prof. Aldrich suggests. The tarsi differ in four main points: The third tarsal joint is not so widened; the expanded base of the appendage of first joint is wider and shorter, not so narrowed; the two black disks of appendage of third joint are not circular, especially the terminal one which is pointed-oval, and the membraneous expansion of the same appendage occupies a reversed position on the main stalk, being on the anterior side of it, instead of on the posterior as in *ornatipes*. It is to be hoped that Prof. Aldrich will publish the drawings of his species, together with a description of it.

NOTES ON NOCTURNAL LEPIDOPTERA.

BY A. R. GROTE, BREMEN, GERMANY.

AGROTIS ALBALIS.

My types of *albalis*, now in collection Brit. Mus., belong to a western species showing a charactertistic white downy surface of the primaries, obscuring the ornamentation. My single type of *cloanthoides* in coll. Graef. belongs to a smooth-winged form with distinct, sordid or brownish-black Cloantha-like markings. It does not appear that *albalis* has an European representative, while *cloanthoides* is not unlike *Agrotis signifera*, of which latter it may be the American representative. In his revision Prof. Smith unites *albalis* and *cloanthoides*, apparently on the evidence of a worn example labelled *albalis* in the Bailey collection, and which he claims to be really *cloanthoides*. Thus it seems that the *albalis* of the revision is virtually *cloanthoides*, and Mr. Smith does not know in that work the true *albalis*. I have a recollection of the rubbed specimen in the Bailey collection which is labelled *albalis;* but whether it is one of the original lot or whether I named it during a visit to Albany, I cannot now say. Probably the former, and that I did not recognize it as distinct. When I described *albalis*, I did not know yet *cloanthoides*, and so it might be that a worn specimen of *cloanthoides*, with the markings lost, might have been wrongly labelled by me, escaping special notice among several *albalis*. But now in the synonymic catalogue Mr. Smith has seen my types and the real *albalis*, and considers *cloanthoides* as at least a good variety. In my opinion there is little doubt that the two are specifically distinct. Apparently Prof. Smith does not recognize colour as a character of a true variety, and when a form intergrades with the type he refuses

Digitized by Google

the varietal name. So he will not recognize red *specialis* as entitled to a varietal name in contradistinction with olive-coloured *Wilsonii*, and yet a more glaring contrast in appearance can hardly be found. It is generally characteristic of varieties that they intergrade, and of species that they do not. Non-intergrading varieties would seem to be on the road to species.

AGROTIS SEMICLARATA.

I believe, eventually, that this form will be found to represent a distinct species from my *A. vancouverensis*. The hind wings beneath are distinctly half-pale Mr. Smith says: "The figure in the Illustrated Essay is very characteristic and recognizable, and renders determination easy. Butler says it is the ♀ of *vancouverensis*, but I have seen both sexes of the form." Well, if Mr. Smith has seen both sexes of *semiclarata*, how can it be treated as a mere synonym of *A. vancouverensis*, Grt.? One would think that it must be a variety at least. I expect, indeed, that time will show that *vancouverensis (=agilis?)*, *semiclarata*, *clodiana*, all three thrown together as one in the Revision, will prove to be, as I stated originally, three distinct species. In several cases its author has been obliged to change his decisions. This happens not unfrequently in this world when one has little consideration.

AGROTIS DOCILIS.

I had only a single ♀ type of this species expanding 48 mil., from Professor Snow, Colorado. This is referred as a variety to *perexcellens*, Grt., in the Revision, p. 144. Prof. Smith says: "*Docilis* is based on a large specimen in which lilac predominates. The fine series before me proves its identity with the normal form of *perexcellens* in which the pale colours are gray and yellowish." I have not the slightest hesitation in accepting this reference as correct. I say in my description: "Large sized, resembling *perexcellens* (etc.) in the markings. Lilac gray over blackish fuscous," etc., Bull. Geol. Surv. VI., 259. I never had but the one specimen, and if a specimen of another species of *Agrotis* bears the label "*docilis*" it is the result of accident, at the moment unexplainable by me. At the time, and just because I only had the one specimen, I had my doubts about its distinctness, but the colour was so different that I concluded I had to do with another species. *Docilis* should thus be referred as a colour variety of *Perexcellens*.

Digitized by Google

NORTH AMERICAN THYSANURA—V.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

In a previous paper there were given analytical tables to the genera of the families Aphorouridæ and Poduridæ; in the present paper will be found a table to the families and a table to the genera of the Entomobryidæ. The Smynthuridæ and Papiridæ are each represented by a single genus.

The families recognized can be separated by means of the following table:—

A. Furcula* wanting.....*Aphoruridæ.*

AA. Furcula present.

B. Furcula attached to the ventral side of the antepenultimate abdominal segment.....*Poduridæ.*

BB. Furcula attached to the ventral side of the penultimate abdominal segment.

C. Abdomen elongate, cylindrical, much longer than broad.....*Entomobryidæ.*

CC. Abdomen globular, but little longer than broad.

D. Terminal segment of the antennæ long, ringed ....*Smynthuridæ.*

DD. Terminal segment of the antennæ short, with a whorl of hairs .....*Papiriidæ.*

ENTOMOBRYIDÆ.†

Antennæ with from four to six segments; eyes present or wanting; postantennal organ wanting; abdomen cyclindrical, much longer than broad; tarsi with two claws; furcula always present, attached to the penultimate abdominal segment.

A. Body naked or clothed with hairs.

B. Antennæ four-jointed.

*Furcula is the name used by Tullberg for the ventral spring, the basal segment is the manubrium, the middle segment the dentes, and the apical segment the mucrones.

†Schott describes the following new species from California, and adds several European species:—*Entomobrya nivalis*, Linn, p. 16. *E. multifasciata*, Tullb = *D. decemfasciata*, Pack, p. 17. *E. marginata*, Tullb, p. 17. *Sira purpurea*, Schott, p. 17. *Drepanura californica*, Schott, p. 19. *Orchesella rufescens*, Lub., p. 21. *Isotoma viridis*, Bour. var. *aquatilis*, Lub. = *I. tricolor*, Pack, p. 22. *I. palustris*, Muller, p. 22. Also the following Poduridæ and Aphoruridæ:—*Achorutes viaticus*, Tullb., p. 23 *A. armatus*, Nic. = *marmoratus*, Pack, p. 23. *Xenylla maritima*, Tullb., p. 24. *Lipura inermis*, Tullb. = *L. fimetaria*, Pack, p. 24.

Schott Beitrage zur Kenntniss Kalifornischen Collembola, Bihang Kongl. Svens. Vet. Akad. Hand. Bd. 17. Afd. IV. No. 8, pp. 1-24, 1891.

Digitized by Google

C. With a single eye-patch on each side of the head.

D. Third and fourth abdominal segments subequal above.

E. Dentes not extending beyond the ventral tube....*Isotoma*, Bourl.

EE. Dentes extending beyond the ventral tube . *Corynothrix**, Tullb.

DD. Fourth abdominal segment three or four times longer than the third.

E. Mucrones falcate, not with an anteapical tooth..*Drepanura*†, Schott.

EE. Mucrones not falcate, with an anteapical tooth.

F. Eyes arranged promiscuously, not in two straight longitudinal and four transverse rows.....*Entomobrya*, Rond.

FF. Eyes arranged symmetrically, in two straight longitudinal and four transverse rows.....*Salina*, MacG.

CC. With two eye-patches on each side of the head . *Sinella*, Brooks.

BB. Antennæ six-jointed.....*Orchesella*, Temp.

AA. Body clothed with flattened scales.

B. Antennæ four-jointed.

C. Apical segments of antennæ ringed.

D. Eyes present, twelve, six on each side of the head. *Tomocerus*, Nic.

DD. Eyes wanting..... ....*Tritomurus*, Frau.

CC. Apical segments of antennæ simple, not ringed.

D. Eyes wanting.....*Beckia*, Lub.

DD. Eyes present, sixteen, eight on each side of the head.

E. Mesonotum simple, head exposed.....*Seira*, Lub.

EE. Mesonotum projecting over the head and in part concealing it.....*Lepidocyrtus*, Bour.

BB. Antennæ five-jointed.

C. Eye spot with a single ocellus; apical segment of the antennæ ringed..... .....*Templetonia*, Lub.

CC. Eye spot with eight ocelli; apical segment of the antennæ simple..... .....*Strongylonotus*, MacG.

*Tullberg erected this genus for the reception of a species from Nova Zembla, *C. borealis*, Tullb. The characters separating it from *Isotoma* are certainly superficial.

†As the description of this genus may be inaccessible to many, it is appended: "Mesonotum non prominens. Segmentum abdominale quartum triplo vel quadruplo longius quam tertium. Antennæ dimidia parte corporis breviores, quadriarticulatæ, articulo secundo et tertio inter se fere aequalibus, quarto omnium longissimo. Ocelli 16; 8 in utroque latere capitis. Pili clavati praecipue in regione cervicis et in segmentis apicalibus stipati. Mucrones furculae parvi falciformes. Squamæ? Type, *Drepanura californica*, Schott.

Digitized by Google

*Salina**, gen. nov.—Eyes sixteen, arranged in two straight longitudinal and four transverse rows; antennæ four jointed, twice as long as the head, segments subequal; tarsi with two claws; third and fourth abdominal segments unequal; body naked. Type, *Salina Banksii*, sp. nov.

Salina Banksii, sp. nov.—Light olive; a line between the antennæ, the eye spot, a line down each side of the body, blackish-purple; underneath olive; antennæ purplish, with a dark ring at the apex of the three basal segments, segments much lighter at base, hairy; legs long, slender, light olive washed with purplish, densely covered with long bristles; claws short, blunt, without teeth, inner half the length of outer; tenant hair wanting; furcula long, slender, white, bristly; the mucrones small, divided, the upper part bowed, the end truncated, and with two notches, the lower rounded, ovate. Length, 1.25 mm.

Habitat: Florida, (Nathan Banks, collector).

Named after my friend, Mr. Nathan Banks, of Sea Cliff, Long Island, New York.

Strongylonotus†, gen. nov.—Ocelli sixteen, eight on each side of the head; antennæ five-jointed; tarsi with two claws; mesonotum projecting over the head; third and fourth abdominal segments unequal; body covered with scales. Type, *Strongylonotus Summersii*, sp nov.

Strongylonotus Summersii, sp. nov.—Head small, white, eye spot black; antennæ long, slender, densely covered with long hairs, attached to the head at the apex of the eye spot, first and second segments subequal, white, third segment subequal to the second, much narrowed towards the apex, white, apex with a purplish ring, fourth segment subequal to the third, the basal half expanded, ovate, light purplish, the apical half dumb-bell shaped, with the sides distinctly hollowed out, black, appearing as a distinct segment, apical segment two-thirds the length of the fourth, black, basal two-thirds dumb-bell shaped, not so distinctly so as the apex of the fourth, apical third enlarged at base, pointed at apex, slightly incurved on the outside; side of the mesonotum, the most of the second and all of the third abdominal segments, and a broad band across the apex of the fourth, purplish; legs long and slender,

*Derived from the name of a village.

† στρογγύλος, rotundus; νωτος, dorsum.

Digitized by Google

densely hairy, similar to those of *Salina Banksii*, white, except the apex of the hind coxæ, and the hind femora, except at apex, purplish-black; claws slender, outer one-fourth longer than inner, with two teeth, inner more slender than outer, without teeth; tenant hair present; abdominal segments unequal, first indistinct, second and third subequal, fourth eight or ten times longer than third; furcula white, long, stout, densely hairy beneath, reaching beyond the ventral tube; manubrium broad, with a purplish stripe down each side, reaching about the middle of the fourth abdominal segment, with several spines at apex; dentes about as long as the manubrium, smooth, lateral hairs twice the length of ventral, serrate beneath; mucrones one-half longer than broad, with a stout terminal hook and a basal denticle. Length, 3.5 mm.

Habitat: El Pilur, Venezuela. (Summers, collector).

Named after Prof. H. E. Summers, of Champaign, Illinois.

SMYNTHURIDÆ.*

The following table will probably be found useful in separating the species of *Smynthurus*. All the species are included except *quadrisignatus*, Pack., which is not certainly known and not sufficiently characterized to be placed from the description :—

A. Abdomen not with a dorsal spine.
B. Furcula not with laterally developed bristles.
C. Abdomen not black with white spots.
D. Fourth segment of the antennæ not ringed..... *minutus*, n. sp.
DD. Fourth segment of the antennæ distinctly ringed.
E. Fourth segment with six sub-segments..... *hortensis*, Fitch
EE. Fourth segment with more than six sub-segments.
F. Fourth segment with eight sub-segments..... *ferrugineus*, Pack.
FF. Fourth segment with more than eight sub-segments.
G. Fourth segment with nine sub segments.
H. Size small; colour deep delicate roseate..... *roseus*, Pack.
HH. Size moderate; colour black with lighter markings *elegans*, Fitch.
GG. Fourth segment with ten sub-segments..... *arvalis*, Fitch.
CC. Abdomen entirely black with four small dorsal white spots.

*Schott adds the following :—*Smynthurus eisenii*, Schott, p. 7. *S. luteus*, Lub., p. 11. *S. niger*, Lub., p. 12. *S. plicatus*, Schott, p. 13.

Digitized by Google

D. Head between the antennæ wholly black.. *quadrimaculatus*, Ryder.

DD. Head between the antennæ black with two white spots..... *sexmaculatus*, Harvey.

BB. Furcula with a row of long bristles on both sides of the dentes, fan-like..... *spinatus*, MacG.

AA. Abdomen with a dorsal spine..... *floridana*, MacG.

Smynthurus minutus, sp. nov.—Black and yellow; head yellow, except behind and the eye spots, which are black, black extending around on the side of the face below the eye spots; eye spot narrowly encircled with yellow; on each side below the eye spot, three clear spots arranged in a transverse line; a black speck, ocellus-like, on the vertex between the antennæ; antennæ reaching beyond the apex of the thorax; basal segment black, globular, one-half the length of the second; second segment subequal to the third, yellow, petiolate at base, naked; third segment about one-half the length of the fourth, enlarged at middle, yellow, with a few scattered hairs; fourth segment yellow, blunt at tip, moderately hairy, not ringed; thorax black, except a small part of the sternum, which is yellow; legs short, stout, yellow; claws short, outer claw about as long as the tibia is broad, sinuate beneath, with a single tooth, inner claw two-thirds the length of outer, broad, stout, with a single tooth above; three tenant hairs present; abdomen black, except a yellow spot on the underside of the anal tubercle, naked, except a few bristles on anal tubercle; furcula slender, slightly hairy beneath; manubrium reaching the middle of the anal tubercle; dentes subequal in length to the manubrium; mucrones one-third the length of dentes, simple, pointed, with a slight hook at apex, with a high power appearing very finely serrate. Length, 1 mm.

Habitat: Ithaca, New York.

Collected by Mr. R. H. Pettit under pieces of wood in a plant jar in the University Insectary.

PAPIRIIDÆ.*

Papirius purpurescens, sp. nov.—Blackish purple; head between the antennæ washed with yellowish, second segment of the antennæ (remainder wanting) and the claws white or transparent; the remainder of the body, including the entire furcula, blackish purple; basal article of the antennæ very short, one-third the length of the second; legs long, slender,

*Schott adds a single species, *Papirius maculosus*, Schott, p. 14.

Digitized by Google

hairy; claws short, stout, outer broadly rounded, with two teeth, one at middle, the other at base, inner claw nearly as long as outer, more slender, with two bristles at tip; tenant hairs present; abdomen slightly hairy, more abundant at apex, anal tubercle with a few scattered fringed clavate hairs; furcula long, slightly hairy above; manubrium extending half its length beyond the apex of the abdomen, stout; dentes subequal to the manubrium in length, narrowed beyond the base; mucrones one-fourth the length of the dentes, apex blunt, slightly serrated at middle Length, 3 mm.

Habitat: Sea Cliff, Long Island, New York. (Banks, collector).

Readily recognized by the purple legs and furcula.

Papirius olympius, sp. nov.—Reddish, spotted with dark brown, in young specimens purplish; eye spot black; vertex covered with stiff bristles; a longitudinal brown band extending from the back of the head to the eye spot, another in the middle of the vertex, extending down the middle of the front; antennæ nearly as long as the body, purplish, hairy, basal segment light at base, dark at apex, one-fourth the length of the second, second one-half the length of the third, third segment slender, with seven sub-segments at apex, fourth segment with six sub-segments; abdomen and thorax with two sinuate brown bands on each side of the dorsum, the middle ones meeting at the apex and base of the thorax, and on the basal half of the abdomen, also a band extending from this basal transverse band of the abdomen along the middle of the back towards the head, bilobed in front, a triangular spot just before the apex of the abdomen and promiscuous mottlings on the side, brown; body covered with broad flattened hairs; legs long, slender, spiny, reddish; claws long, outer three times as long as the tibia is broad, with two teeth, inner two-thirds the length of outer, with a hair at apex reaching beyond the apex of the outer claw; tenant hair wanting; furcula slender, long; manubrium short, two-thirds the length of the dentes; dentes with a row of long hair-like spines along each side of each member; mucrones about one-fourth the length of the dentes, serrate beneath. Length, 2–3 mm.

Habitat: Olympia, Washington. (Kincaid, collector).

Digitized by Google

BOOK NOTICES.

THE INTER-RELATION OF INSECTS AND FLOWERS.—During the last eight years there have appeared from the pen of Mr. Charles Robertson, of Carlinville, Ill., several most interesting articles on the inter-relation of insects and flowers. The titles are as follows :—

Botanical Gazette.

1886. Notes on the pollination of Asclepias.
1887. Insect relations of certain Asclepiads.
1887. Fertilization of Calopogon parviflorus.
1888. Effect of the wind on bees and flowers.
1888. Zygomorphy and its causes : I—III.
1889–93. Flowers and insects : I—XI.

Trans. Am. Ent. Soc.

1889. Synopsis of North American species of Oxybelus.
1891–93. Descriptions of new species of North American Bees.

Trans. St. Louis Acad. of Science.

1891, 1892. Flowers and insects : Asclepiadaceæ to Scrofulariaceæ.—Umbelliferæ.—Labiatæ.

Mr. Robertson began in 1886 to study the visits of insects to flowers, and by his persevering observations he has succeeded in collecting an enormous number of facts which he has published mostly in the Botanical Gazette, and in the Transactions of the St. Louis Academy of Science. He has studied the subject especially from a botanical point of view, and has given particular attention to the attractions offered to insects by the flowers of different species of plants, to the peculiarities of arrangement of their different parts, to their coloration, and to the modifications which many flowers seem to have undergone from their being constantly frequented by certain species of insects. Such studies have nevertheless an immediate bearing on entomology, as they give us at the same time an insight into the purposes of insects in visiting flowers, into their habits of feeding and collecting either nectar or pollen, or both at once, and into the intelligence they display in order to attain their end. The close attention thus necessarily given to insects has had besides the natural result of causing Mr. Robertson to discover that many of those insects which he was observing in his locality, Carlinville, Ill., had not even been described. Therefore, he found it "necessary at first to pay particular

Digitized by Google

attention to collecting and determining the insects." He was helped in this work by specialists in Diptera and Coleoptera, and had himself to work out and describe many species of Hymenoptera: 10 out of 14 species of *Oxybelus*, 28 out of 30 of *Andrena*, and at least 30 other species of Andrenidæ. The descriptions of these have appeared in the Trans. Am. Ent. Soc., 1889–1893.

The two great agencies of cross-fertilization of flowers are the wind and insects; hence Mr. Robertson has thus been led to notice some interesting facts concerning the effect of wind on bees and flowers. (Bot. Gaz., XIII., 1888, p. 33).

The first papers by Mr. Robertson are on the pollination of Asclepias, the flowers of which are most interesting in their peculiar adaptation for cross-fertilization by the agency of insects. Their structure and the great difficulty the smaller insects have in effecting pollination, lead Mr. Robertson to believe that "bumble-bees have had most influence in modifying the flowers, and they are the most common visitors after the hive bees. Hive bees, it is to be remembered, do not belong to our fauna."

Our space is too limited to allow us to follow the writer into what he has observed in all the different orders and species of flowering plants studied; but the names of all the insects observed visiting the flowers are given, as well as tabular data of the respective number of visitors of the different classes—Hymenoptera, Diptera, Lepidoptera, Coleoptera and Hemiptera.

As an instance, it may be mentioned that on the flowers of *Ceanothus Americanus* there were seen 48 species of Hymenoptera, 45 of Diptera, 2 of Lepidoptera, 13 of Coleoptera, and 4 of Hemiptera; and considerations are given, as in the case of all other blossoms treated of, on the arrangement of the flowers, their form, colour and other peculiarities of structure, some of them exceedingly minute, in which close and patient observation often succeeds in discovering most wonderful purpose and design for insuring cross-fertilization. These investigations are of great interest, and we commend them to the attention of Entomologists and Botanists as a fertile field of useful special study. Our idea in mentioning these excellent articles of Mr. Robertson's is to draw to this subject the attention it deserves from Entomologists, who from their place of publication might not be aware of their existence.

J. A. GUIGNARD AND J. FLETCHER.

Digitized by Google

BUTTERFLIES FROM CHINA, JAPAN AND COREA. By John Henry Leech, B. A., F. L. S., &c. In parts, 4to, 642 pp., 43 Plates; R. H. Porter, London, Dec., 1892—Jan., 1894.

The fifth and last part of the letter-press of Mr. Leech's work has just been issued, and is accompanied by the statement that five plates of Hesperiidæ and a supplemental plate will shortly follow, completing the work. Presumably, these plates will be accompanied by the letter-press of the title page, preface, and index, with which the work will be ready for the binder. As to the typography of the book, it must be said that it leaves nothing to be desired. The paper is luxuriously heavy; the type is beautifully clear and large; and the text conspicuously free from errors of a minor character, such as occasionally appear even in the most carefully edited works. The scholarship and taste of Mr. Leech and his accomplished secretary, Mr. Richard South, are reflected in the execution of the literary portions of the work. The plates, which are from drawings by William Purkiss, and are executed by chromo-lithography by William Greve, of Berlin, are without doubt the finest examples of this form of work which have as yet graced any similar publicatiou. While a preference is by many accorded to figures lithographed and afterwards coloured by hand, and the most exquisitely perfect illustrations have been produced in this way, and while the results of chromo-lithography as ordinarily employed in scientific illustration have generally been more or less marred by striking crudities, these plates before us are most marvellous illustrations of the capabilities of the chromo-lithographic process, when employed by those who are masters of the art. The plates are almost perfect facsimiles in form and colour of Mr. Purkiss's exquisite drawings, and the student of Chinese and Japanese lepidoptera may well rejoice upon having at his command such an infallible guide to specific identity as is found in these beautiful illustrations. The only adverse criticism which the mechanical and typographical execution of the work admits is on the score of the bulk of the letter-press which will necessarily be bound up in one volume. The heavy paper employed results in the production of a book which as a manual of reference promises to be somewhat uncomfortably "fat."

The title of the book indicates the consciousness of the author that in our present state of knowledge any effort to deal with the lepidopterous fauna of the great regions covered by this work must at best be attended by imperfections. There are wide areas in China in which little

Digitized by Google

or no attempt has yet been made to make collections, and it must necessarily be many years before it can be asserted that our knowledge of the faunistic resources of Central Asia is complete. In his classification, Mr. Leech follows the order now almost universally recognized by writers in England and on the continent as most natural. He erects, so far as the writer has been able to observe, no new genera, and while giving us a large number of new species, appears to have pursued a conservative course in this regard, which is to be commended. To the student of Asiatic lepidoptera, the work is simply indispensable, and will remain a lasting monument of the energy and scientific accomplishments of its learned and enthusiastic author. W. J. HOLLAND.

SCIENCE GOSSIP. New Series: Vol. I., No. 1, March, 1894. London: Simpkin Marshall, Hamilton, Kent & Co.

After the lapse of a few months the old established and deservedly popular magazine, "Hardwicke's Science Gossip," re-appears under the above title, with a change of editor and publisher, but, we are glad to find, with no serious change of plan or scope or style. The new editor, Mr. John I. Carrington, was for thirteen years editor of the London *Entomologist*, and also connected for a long time with the *Field* newspaper as a contributor to its Natural History Department; he has associated with him a long list of able assistants, and we may feel every confidence that the new series of the magazine will be as useful and entertaining as any of the preceding volumes. The first number now before us contains many interesting papers, including two on entomological subjects: British Dragon-flies and Roosting Butterflies, the latter with two pretty illustrations. We can heartily commend this publication, and trust that many of our readers will subscribe to it and receive a monthly store of delight.

MYRIAPODES DES ENVIRONS DE GENÉVE PAR ALOIS HUMBERT. Genéve et Bale: Georg & Cie, 1893.

We have to thank M. Henri de Saussure, the editor and publisher of this posthumous work, for this handsome addition to the library of our Society. It is a quarto volume, well printed and illustrated with a portrait of the late M. Humbert, and fourteen beautifully executed plates of Myriapods and their structural details. To any one interested in the study of these rather neglected creatures, this work must be perfectly invaluable.

Digitized by Google

EIGHTH REPORT OF THE INJURIOUS AND OTHER INSECTS OF THE STATE OF NEW YORK FOR THE YEAR 1891. By J. A. Lintner, Ph. D., State Entomologist, Albany, 1893.

Anything published by Dr. Lintner is sure to contain much valuable information and to be highly interesting, whether the subjects treated of are new to us or not. The report before us fully supports this statement. It treats of a large number of insects, injurious or otherwise, and gives in most cases a life history of each, including the author's own observations, which are always accurate and clearly detailed. Attention may especially be drawn to the accounts of the Raspberry Geometer (*Synchlora glaucaria*), the Birch-leaf Bucculatrix (*B. Canadensisella*), and the Pear-midge (*Diplosis pyrivora*). An appendix contains some very interesting popular lectures on Economic Entomology, which are well worth perusal. The only drawback to the report is the late date of its publication, which is more than two years after the observations recorded in it were made.

REPORT OF THE ENTOMOLOGIST AND BOTANIST (James Fletcher, F. R. S. C., F. L. S.), Central Experimental Farm, Ottawa, 1894.

Mr. Fletcher's reports are always interesting and valuable, and the present record of the chief insect attacks of last year and his observations upon them, is not less so than its predecessors. The season of 1893, as far as destructive insects were concerned, was only remarkable for the superabundance of locusts (grasshoppers) and the consequent damage inflicted upon oats and many other field and garden crops. Other attacks were for the most part of the familiar kinds which we have always with us; these are briefly mentioned in the report, while more attention is paid to the serious injury caused to grain crops in Manitoba and the Northwest by cut-worms, the ravages of locusts, granary insects at the Chicago Exhibition, the Horn-fly, etc. Very interesting accounts are also given of *Silpha bituberosa*, which attacks vegetables in the Northwest Territories, and *Polyphylla decemlineata*, which was very injurious to shrubs of various kinds in a nursery at Victoria, B. C.

In the botanical section of the report there are two papers especially noteworthy, those, namely, on grass for the protection of shores and harbours, and on the "Tumble-weeds" of the Northwest. The pamphlet is illustrated by a handsome full page picture of Mr. Fletcher's grass plots at the Experimental Farm, which are full of interest to every visitor, and thirty wood-cuts. It is gratifying to observe how steadily the author's reputation is growing, and how highly his work has come to be appreciated from one end of the Dominion to the other.

Digitized by Google

CORRESPONDENCE.

GENERA OF THYSANURA.

Sir,—The recent changes in the generic names of Thysanura (Vol. xxv., p. 313 et seq., vol. xxvi., p. 54) suggest a few comments.

Lipura and *Anoura* are changed because preoccupied in Mammalogy. I do not find these names in Flower and Lydekker's recent work, and it may be that they do not represent valid genera of Mammals. But on p. 314, Mr. Macgillivray states that both *Anurophorus* and *Adicranus* have for their type *Podura fimetaria*, which belongs to *Lipura*, Burm. Why, therefore, is the new name *Aphorura* proposed for *Lipura*, when two names, neither apparently preoccupied, already exist?

Anoura, it appears, had also been used for a genus of Echinoderms previous to the publication of the Thysanuran genus.

Triæna had been used three times before the genus of Thysanura was named, so it will doubtless have to be changed, as Mr. Grote indicates. But can the name *Macgillivraya* be used? I find in Scudder's Nom. Zool. a genus *Macgillivraya*, Forbes, 1851, belonging to the Mollusca.

What is the date of *Lubbockia*, Haller? Apparently 1880. But I find in Scudder's work a genus *Lubbockia*, Claus, of Crustacea, dating from 1862. T. D. A. COCKERELL, New Mexico Agric. Exp. Station.

ERRATA.—Can. Ent., p. 32, line 4, for PROSOPOPHARA read PROSOPOPHORA. Can. Ent., p. 36, line 6, for "the ridiculous" read "be ridiculous." Can. Ent., p. 38, line 22, for Coleopterous read Coleophora.

CALOTARSA ORNATIPES.

Sir,—Professor Townsend has been misled by certain resemblances in referring his new genus *Carlotarsa* (CAN. ENTOM., XXVI., p. 50), to the Syrphidæ, where it certainly would be an anomalous form. It belongs among the Platypezidæ, and is apparently synonymous with *Platypeza*, though it may be new. The family receives its name from the peculiar structure of the tarsi, There have been three genera with terminal arista described from North America belonging among the Syrphidæ—*Ceria*, *Pelecocera*, and *Callicera*. (See Snow, Kans. University Quarterly, Vol. I., Part I., 1892). S. W. WILLISTON, Lawrence, Kansas, Febr. 9, '94.

Mailed March 31st.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, MAY, 1894. No. 5.

BUTTERFLIES COMMON TO NORWAY AND ARCTIC NORTH AMERICA.*

BY F. M. WEBSTER, WOOSTER, OHIO.

In his "Fortegnelse over Norges Lepidoptera" (Christiania Videnskabs-Selskabs Forhandlinger for 1893, No. 13), Dr. W. H. Schoyen, State Entomologist of Norway, has given us a list of 1267 species of Lepidoptera that inhabit his country, tabulated to show the Provinces in which they occur, and the exact latitude over which each species is known to be distributed. The interest which this list posesses for the American entomologist is in the number of species it contains that are common to both countries. As studies of this nature are of much interest to the student of geographical distribution, but unfortunately out of the reach of many, I here give a list of such species as occur with us, their distribution being given both in America, as far as I am able to do so, and in Norway according to the information contained in Dr. Schoyen's list.

It will aid us considerably in understanding the subject, to keep in mind an idea of the topography of Norway, stretching as it does from lat. 58° to 71°, and throughout this distance consisting of a narrow stretch of country lying between a mountain range and the Arctic Ocean. Northward from about 62° 30′ the provinces extend from the sea inland to the mountains, but south of this a range of mountains extends through near the centre with provinces lying both to the east and to the west.

Papilio machaon, Linn. This is the only species of the genus included in the list, and occurs in all but six of the eighteen provinces of Norway, ranging from the extreme south at lat. 58° to 70° 18′, the unoccupied area, however, being the central and the very extreme northern parts of the country. In North America, var. *Aliaska*, Scudder, is quite common in Alaska, from whence it extends eastward to Hudson Bay at about 51° 30′, though I find no proof of its holding this latitude to the

*Read before the Ohio Academy of Science, Dec. 28, 1893.

Digitized by Google

Pacific Coast. *P. machaon* has been reported as far south as the north-western United States, probably about lat. 48° or 49°, by Dr. Hagen and Prof. Henshaw.

Pieris rapæ, Linn. This is found in ten provinces, thus covering a less area than the preceding, and ranging from 58° to 69° 30′, or from the extreme southern to within one and one-half degrees of the northern extremity. In America it extends from the Atlantic Coast to the Rocky Mountains, and from about lat. 30° to 48° and possibly beyond.

Pieris napi, Linn., (cum *v. nepææ*, Esp., and *bryoniæ*, Ochs.) This has a still wider range in Norway, occurring its entire length from 58°. to 71°. and in all but one of the provinces, this being Stavanger, at the south-west and coastal. With us, *bryoniæ* is found from Alaska eastward to Newfoundland. In his recent work, "Brief Guide to the Commoner Butterflies of the Northern United States and Canada," Mr. S. H. Scudder has considered this species under the specific name *oleracea*, Bois., of which he says: This northern species occurs throughout all but the southern parts of our region, though in scanty numbers except in mountainous districts; it appears, however, to be absent from the prairies west of the Mississippi river, and wherever it has come in contact with *P. rapæ*, it has become relatively rare. Prof. French calls my attention to *napi* being given in Mr. Edwards's list of 1884, from Michigan, and Prof. Blatchley has since recorded it from northern Indiana, about lat. 41°, which is probably about its southermost limit, east of the Rocky Mountains.

Colias palæno, Linn., (*v. Lapponica*, Stg.) This is almost as widely diffused in Norway as is the preceding, occurring in all but four of the provinces and ranging from 58° to 70° 25′. It is rather a curious fact that provinces where it is not recorded as occurring, Stavanger, South Bergenhus, North Bergenhus and Romsdal, all lie in the south-western part of the country, along the coast, while inland it is found in precisely the same latitude. With us *C. palæno* is found in Labrador.

Colias hecla, Lef. The Norway distribution of this species is limited to three provinces, Nordland, Tromso and Finmarken, the range being from 66° 50′ to 70°, these provinces being the three northernmost. In North America the species is distributed from Alaska to Greenland, its southern boundaries being as yet undefined. In case *C. Meadii* and *C. elis* should either one prove to be varieties of *C. hecla*, then Mr. Thomas

Digitized by Google

E. Bean's record of its occurrence at Laggan, Alberta, 51° 25′, will be the southern limit on the Pacific coast for the latter, while the former extends to Colorado, at least so far as we now know.

Vanessa antiopa, Linn. This is recorded as occurring 58° to 70°, and in all but two of the provinces, Stavanger and North Bergenhus, on the south-western coast and included in the area over which *Colias hecla* is reported not to inhabit. However, as the two provinces are separated by South Bergenhus, in which the species is recorded as being present, we are led to suspect that it may yet be found in one or both of these now unoccupied provinces. With us the species occurs throughout North America.

V. atalanta, Linn. Dr. Schoyen records this from eleven provinces, and ranging from 58° 38′ to 63° 26′. With us this is as widely distributed as the preceding.

V. cardui, Linn. This, in Norway, occurs in two-thirds of the provinces, and ranges from 58° to 69° 40′. In America it is as generally distributed as the preceding. In Norway the area where it is not recorded comprises the south-west coast provinces.

Argynnis chariclea, Schn. This appears to occur in only a single and at the same time the most northern province, ranging only from 69° 20′ to 70° 42′. In America, it ranges from Labrador, Hudson Bay and Gulf of St. Lawrence on the east, to probably about lat. 51° 25′ on the Pacific Coast, no where, according to Mr. Edwards, extending into the United States.

A. polaris, Boisd. This has in Norway a very little wider range than the preceding, occurring in only two provinces, Tromso and Finmarken, and covering area between 69° and 70° 25′. In regard to the distribution of this species in North America, the only records to which I have access give the habitat as Arctic America, Greenland and Labrador.

A. freija, Thbg. The Norwegian range of this species is much wider than that of the preceding, occurring, as it does, in eight of the eighteen provinces, and over an area extending from 59° 35′ to 70° 25′, being absent in the extreme southern and also the extreme northern portions. Of these ten provinces where it is not recorded as occurring, one is located in the central (coastal), three south-eastern (inland), two southern (one coastal and the other adjoining inland), two south-western (coastal), and two western (coastal), and presumably the extreme north coastal part of Finmarken, the northernmost territory of the country. In

Digitized by Google

America this species is considered as synonymous with *A. freya*, Thunb. With us it occurs from Alaska to Labrador and westward to the Rocky Mountains, which range it follows southward to Colorado, about lat. 39°. It is probable that in southern Norway it is also confined to the mountain regions.

A. frigga, Thbg. Dr. Schoyen's list restricts this to four provinces—Akershus, Buskerud, Tromso and Finmarken. The first two are northern coastal, the last two southern inland. The range is from 59° 56′ to 70° 40′. With us it is recorded as inhabiting Arctic America and Labrador, and from Alaska south along the Rocky Mountains to Colorado.

Erebia disa, Thbg. This is recorded as inhabiting but two provinces, Finmarken and Nordland, the former the northernmost and the latter in the central portion of the country, the two being separated by the province of Tromso. The range is limited to from 66° 50′ to 70°. In America, we have the variety *mancinus*, Db-Hew, which appears to be quite common in northern Alaska, whence it extends to the Rocky Mountains in British America, with the southern limit not yet defined.

The idea of giving the latitude of the occurrence of species is, it appears to me, much better than giving the name of some out-of-the-way place that is not included on even a small portion of our own maps, to say nothing of those to which entomologists of other countries have access. The name of the place is all well enough, but where the latitude can also be given it will render the statement as to location much more intelligible, both at home and abroad, and this too despite any variation in the matter of isothermal lines.

TRYPETA SOLIDAGINIS, FITCH, AND ITS PARASITES.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

In April of last year I found on the banks of the Ottawa River, at Como, Province of Quebec, a number of very fine stems of a species of Golden-rod. These stems were bare and dry, and bleached by the winter storms. Their attraction for me lay in this—nearly every one of them was burdened with a fine large Trypeta-gall. On some of them two such galls were to be seen. I measured one of the excrescences, and found it to be three inches and five-eighths of an inch in circumference. The galls of the same kind that I have found at Quebec have not been nearly

Digitized by Google

so large nor so abundant. I took a number of the Como galls home with me, and in due time obtained a good supply of perfect specimens of *T. solidaginis* from them.

The species is very fully described by Loew in his "Monograph of the Diptera of North America," Part I., p. 82 (Smithsonian Miscellaneous Collections, April, 1862). To those who have not access to this work, the following brief description of the insect may be acceptable :—

Size.—Expanse of wings, eleven-twentieths of an inch. Length of body, six-twentieths. Width of thorax, two-twentieths.

Head.—Face, whitish. Eyes, bronze-yellow. Antennæ, yellow, short. Mouth-opening wide.

Thorax broad and convex, set with short yellowish hairs, has dark-brown longitudinal stripes. Scutellum, convex and blunt. Wings, large, umber-brown at the base, and then having an umber-brown, zig-zag, scroll-like band ; the hyaline interstices being finely reticulated, more or less, with brown. The legs are flavescent—the femora being somewhat darker.

Abdomen broad at the base, and then gradually tapering to the extremity—the segments being marked with short, whitish hairs. The borer of the female is very distinct. It is flat, of a reddish-brown colour, and tipped with black.

The gall produced by this insect is a pithy gall—it is filled up with the cellular tissue of the plant. Why the wounds caused by some insects should produce galls of this nature, and those caused by others should produce hollow galls, is one of the mysteries of Nature that science has not yet cleared up.

In the Trypeta gall, the short, plump, yellow larva lies snugly ensconsed, closely surrounded by the vegetable tissues. It gradually tunnels a way of exit for the fly ; and then, as the spring draws near, undergoes the pupal change. The pupa is about five-twentieths of an inch long, oval, ochreous, but darkening to brown at the head. This brown portion is ruptured when the fly makes its escape.

I have raised from the galls two kinds of parasites, viz :—*Eurytoma gigantea*, Walsh, and the males (called by Walsh, *Pimpla cœlebs*) of *Pimpla inquisitor*, Say.

Eurytoma gigantea is a very remarkable insect. It is described by Walsh in the 2nd Vol. of the "American Entomologist and Botanist," p. 300, from two females "captured at large."

Digitized by Google

The specimens I have vary greatly in size. The largest of them measure five-twentieths of an inch in length, with an expanse of wings of seven-twentieths.

Head, black, deeply and closely indented (like a thimble) and set with short white bristles. Eyes, round, prominent and set high up in the head. Ocelli very small. Antennæ 9-jointed (8 in the flagellum). Walsh gives the proportions of the joints very accurately as 14, 3, 6, 5, 5, 4, 4, 4, 6. Palpi black.

Thorax, black, more coarsely punctured than the head. Wings hyaline, veins honey-yellow. Legs, black—the hindmost and middle pairs have the knees and extremities of the tarsi yellowish-white; the first pair have the tibiæ and tarsi honey-yellow.

Abdomen, in the female, large, compressed laterally, and ending in a long spur turned upward; black, smooth and polished.

The male, which was unknown to Walsh, differs from the female in these respects:—It is smaller; the joints of the antennæ, with the exception of the scape and the terminal joint, are more nearly equal; the tibiæ of the first pair of legs are considerably infuscated; and the abdomen is rounded, and diminishes regularly. Around the extremity of the abdomen are some white bristles. The head and thorax are coarsely punctate as in the females, and the abdomen is polished and glabrous.

It was too late when I obtained the galls to find the larvæ of *E. gigantea;* but I discovered several pupæ. They occupied the cells of the Trypeta larvæ, and were at first of a pure white waxen appearance. The form of the fly was clearly outlined in them. They gradually darkened till the flies were ready to appear.

Concerning this species, Mr. G. C. Davis, of the Michigan Agricultural College, writes to me, "I am quite sure the chalcid is *Eurytoma gigantea*, although it varies slightly in colour markings.

Pimpla inquisitor, Say. The male of *P. inquisitor* (*P. cælebs*, Walsh, Trans. St. Louis Acad., III., 141) is a very elegant insect, slim and graceful. Its length is three-tenths of an inch; expanse of wings, five-tenths; length of antennæ, two-tenths. *It has a white face*, in which it differs from the female; and the palpi are white. The first joint of the antennæ is black and much larger than the other joints, which are dark-brown. The other parts of the head are black, rough and thickly set with short whitish bristles, as are also the thorax and abdomen.

The first and second pairs of legs are orange-red, with whitish tarsi. The third pair have the femur orange, with black at the extremity. In this pair the tibia and tarsus are beautifully banded with black and white.

I obtained 10 males from about 50 Trypeta galls, but not one female—the females, however, are not scarce in these parts. At least half the galls were parasitised by the foes above described.

Digitized by Google

SOME NOTES ON THE COLLECTING SEASON OF 1893.

BY J. ALSTON MOFFAT, LONDON.

After the long, steady and severe winter we had in this locality, every one hoped for an early spring; but in that we were disappointed, things generally being no further advanced at the end of May than they usually are in the middle. June came in warm, but with such continuous rains as to prevent collecting to any extent. Towards the end of the month the weather became more favourable and insect life appeared in profusion; belated species mingling with some that seemed to have emerged before their time. During the first three weeks of July one might have collected all day and night with profit, and as that was impossible, one could see that opportunities were being lost which only occur now and again after long intervals. August was hot and very dry, which seriously affected vegetation and had a correspondingly injurious influence on autumn collecting.

Of the Diurnals, the most notable to me were, *Limenitis ursula*, quite plentiful but difficult to secure; *Pieris oleracea*, abundant in one locality; *Papilio cresphontes* was reported in July, and during August it was frequently seen. On the 8th, I took a trip to Windsor and Detroit. On the way I saw many fine fresh specimens feeding on flowers by the wayside. At Windsor and Sandwich, several were observed, but at Belle Isle they were numerous. I saw six of them feeding on one flower-bed at the same time. It was about the only large butterfly on the wing there at that time. Toward the end of the month battered specimens were seen on the streets of London. On the 26th, I captured three broken specimens that had been flitting about a prickly-ash bush in Mount Pleasant Cemetery. On the 17th of October, I found a number of larvæ on that same bush, and took three of them. On the 21st, the largest of them pupated, the others perished for want of food. I visited that bush on the 20th, the larvæ remaining had about doubled their size, but had a greasy look; there had been some hard frosty nights. On the 13th of February, 1894, that pupa gave forth the imago, a female, extremely small, measuring three inches in expanse of wing, and one and three-fourths from the front of the head to the end of the tail on hing wing. A number of reports have been published of the appearance of *cresphontes* last summer in new localities, or in increased numbers in old ones, indicating that it is spreading north and west and becoming more firmly

Digitized by Google

established where it has obtained a foothold; but it may be periodical in its habits, and 1893 may have been with it also an exceptional year.

In the Heterocera, I secured several good things which I had never taken before. *Acronycta grisea*, a single specimen, and there was but one example of it in the Society's collection. *Xylomiges confusa*, a single specimen; of this also there was but one in the collection, and that in very poor condition.

On the 31st of August, whilst strolling in a bit of woods to the east of the city, I saw a conspicuously bright gray moth resting on the trunk of a tree. Upon close inspection it proved to be new to me. When I removed it from the spreading-board I compared it with what I thought it most resembled, but the nearest approach that I could find to it was *Platycerura furcilla*. Shortly after I had occasion to examine the D'Urban collection, and whilst doing so my attention was arrested by a specimen labelled *Audela acronyctoides*, which recalled to mind my new moth, and upon comparing them they were found to be identical, except in freshness. Mr. Grote in his notes on the D'Urban collection (CAN. ENT., Vol. IX., p. 27), remarks: "The specimen is in poor condition, but its ornamentation being marked, the species is quite recognizable." That is a correct description of it as it is to-day, and my find is a fresh and perfect duplicate of the type, and a really handsome insect. Prof. Smith says in reply to my enquiry: "*Audela acronyctoides* is by no means a common insect; on the contrary, it is decidedly rare, and there are only a few specimens known in collections. It has been taken in a number of localities, always single specimens only, and generally very early in the season."

Some of the late Geometers were quite abundant. From the 19th to the end of August I secured about twenty *Semiothisa caesaria*, Hulst. I found them resting on the trunks of tamarac trees, whilst later on *Petrophora truncata* was quite plentiful. In the early part of October I took over three dozen *Epirrita dilutata*, Bork. On the 9th I secured twenty-seven of them on the same trees from which I took the *Caesaria*. The day was cool, and they sat close; being very conspicuous objects, I secured in about an hour's time all I saw of them, except one; it was sitting on the sunny side of a tree and arose as I approached it, when a Phœbe bird gave chase and had it before it could reach another resting place.

Digitized by Google

Endropia duaria and *Ellopia fervidaria*, although appearing every season to some extent, were also unusually plentiful, and some dark coloured and heavily marked forms of them were obtained.

Although the season was not uniformly good throughout, yet it proved in the end to be one of the best I have had in many years.

The following names are new to the Canadian list :—

Sarrothripa Lintneriana, Speyer. Determined by Prof. Fernald, was sent to him by me in mistake as a micro.

Œdemasia nitida, Pack.

Dasylophia interna, Pack.

Panthea propinquilinea, Grote, or sp. nov. This specimen I took in 1892. I thought at the time that it was an indistinctly marked *P. furcilla*, but upon further investigation I concluded that it required authoritative determination, so I sent it to Prof. Smith, who returned the specimen with the following remarks about it :—" No. 37 is exceedingly interesting and is somewhat different from anything that I have ever seen before. It comes nearest to *Demas propinquilinea;* but I never saw before one quite so well marked as this is. All the specimens from this region are a good deal more powdery and darker with very little contrast in maculation. I would not be at all surprised if a good series of both species would prove the Canadian form distinct."

Hadena vulgaris, G. & R.

Oncocnemis viriditincta, Smith. This is a species that I took a few specimens of at Hamilton, many years ago. It was given a name provisionally and placed with the named material. I had known for long that it was out of place, but forgot it when sending for names. So to avoid that again, I placed a specimen with the unnamed material, and it went to Prof. Smith, with others, in December last. When the Professor sent me the names of the others, he pronounced this one to be an " oddity," saying " It reminds me of some West Indian species," and suspected that it must have been a transient visitor. But upon assuring him that I had taken four of them, that I had seen more of them than I captured, and that they were not all taken in the same year, and on sending to him a male specimen for further examination, he wrote to me thus :

Digitized by Google

"I find on a study of the specimen this time received, that it is an *Oncocnemis*, and further it looks remarkably like a species which I received from Mr. Bean, from McLean, British Columbia, and which I called *viriditincta* from the beautiful greenish tinge of the scales covering the surface. Looking at this specimen to-day I find that this greenish or mossy appearance is rapidly disappearing, and that in an old specimen I can understand that there will be little or none of it to be seen." Whilst farther on he remarks: "It is certainly somewhat interesting and peculiar that you should have found at Hamilton the same species under what it seems to me must be widely different conditions. The matter is of further interest because this makes the second species of this genus which has been found in what may be called the Eastern States, all the others coming from the western plateaus or from the mountains." As a coincidence, I may state that the three or four specimens of *Oncocnemis Saundersiana* which I have taken were secured in the same locality, and also feeding on the Golden-rod.

Hydræcia inquæsita, G. & R.

Semiothisa caesaria, Hulst.

Pyrausta futilalis, Led.

Cacœcia semiferana, Walk.

Lophoderus mariana, Fern.

Tortrix pallorana, Rab.

Cenopis diluticostana, Wlsm.

Exartema versicolorana, Clem.

Penthina impudens, Wlsm.

Sericoris albiciliana, Fern.

Semasia radiatana, Wlsm.

Phoxopteris apicana, Walk.

" *Goodelliana*, Fern.

Cryptolechia obsoletella, Zell.

Digitized by Google

NOTES ON SOME SCALE INSECTS OF THE SUB-FAMILY DIASPINÆ.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEX.

The following notes are intended to throw further light on the affinities of certain little-known species, which I have lately examined :—

(1.) *Chionaspis major*, Ckll.—Found on Heliotrope at Antigua by Mr. C. A. Barber. The ♀ resembles that of *Diaspis lanatus*, but may be distinguished from it without difficulty. There is only one pair of lobes, and these are very large, elongated, and crenate on both sides; they touch one another at their bases, but diverge toward their tapering extremities. There is a small spine near the outer edge of each lobe. On the margin beyond the lobes are three spine-like plates, then a shallow notch, then three more plates, then another shallow notch, then a series of from five to eight spine-like plates, mostly large, one especially so. The produced margins of the segments cephalad of this bear spine-like plates, the first counting from the caudal end having nine, the second 5, the third 8, the fourth 4 or more, the fifth 4 or more small ones, and the sixth only rudiments.

This insect is not allied to the common West Indian *Chionaspis*, *C. minor*, Maskell, but belongs to the group of *C. salicis*, L., etc. The scale is about 4 mm. long, oval, white with brownish exuviæ.

(2.) *Diaspis cacti*, Comst. n. syn. *opuntiæ (opunticola)*, Newst., Ent. Mo. Mag., 1893, pp. 188, 280.

Mr. Wickham has sent me some specimens found in a greenhouse at Iowa City, Iowa (coll. M. F. Linder), which lead me to advance the above synonymy. They present all the characters of *cacti*, and in addition the numerous "spinnerets or pores," and the elongated pores, which form the specific characters of *opunticola*. I cannot believe that there is a distinct species, *D. cacti*, resembling the present one in all other respects, but lacking these pores, and must assume that Comstock's description was so far imperfect. My variety *opuntiæ* (Journ. Inst. Jamaica, Vol. I., p. 256), from Jamaica, looks different owing to the much paler exuviæ (paler, no doubt, because less exposed), but I can see nothing to distinguish it as a species from *cacti*. It has the pores of *opunticola*.

Mr. Newstead's scales differed also a little in colour from typical *cacti*, so that three colour-mutations may be distinguished thus :—

(1.) Exuviæ not strongly contrasting with scale, . = *opuntiæ*, Ckll.

Digitized by Google

(2.) Exuviæ strongly contrasting.

(a.) Scale grayish-white or greenish, ... = *cacti*, Comst.

(b.) Scale pale yellowish-brown, ... = *opunticola*, Newst.

The mut. *opunticola* is from Demerara.

I quite expect that *D. cacti* will itself prove to be a synonym of *D. calyptroides*, Costa. The colour character given by Comstock will not hold, as I found *D. cacti* v. *opuntiæ* had the ♀ sometimes (in February) orange, sometimes pale yellow. The other characters, of the grouped glands, are surely also variable.

(3.) *Aspidiotus fimbriatus*, (Maskell). Syn. *Diaspis* (?) *fimbriata*, Maskell, Trans. N. Z. Inst., 1892 [publ. 1893], p. 208. Found on *Eugenia* in Australia by Mr. Koebele.

Mr. Maskell has kindly sent me specimens, and I am convinced that the species belongs to *Aspidiotus*, and in that genus to the group of *A. nerii*, *destructor*, &c. This reference is borne out by the scale, and also by the terminal portion of the female, which is quite unlike that of any *Diaspis* known to me. The somewhat elongate form of the female is not of any generic significance, or at all events, cannot be considered to outweigh the structural characters of the terminal portion, which are entirely those of an *Aspidiotus*. Unfortunately the male scale is unknown.

(4.) *Aspidiotus dictyospermi*, Morgan. There is an *Aspidiotus* which I found on *Cycas* at King's House, Jamaica, and Mr. Campbell found abundantly on stems of rose at Castleton Gardens in the same island, that is apparently identical with Morgan's *dictyospermi*. The scales look like those of *A. aurantii*, but the shape of the female is as in the majority of the genus, which will distinguish it at once from either *aurantii* or *articulatus*.

The colour of the ♀ is pale yellow.

The terminal portion of the ♀ agrees well with *dictyospermi*. There are three pairs of lobes, the middle pair much largest, and notched without, the second also notched, the third very small. Between the lobes are scaly plates. Cephalad of the third lobe, the margin presents a pair of elongated plates, though not so long as in Morgan's figure of *dictyospermi*. Beyond these are two small plates. There are conspicuous elongated sacs near the bases of the lobes, somewhat after the manner of *A. mimosæ* and *A. smilacis*. The anterior lateral groups of glands are of about three each, the posterior lateral of two.

The scale is red-brown, with covered exuviæ to one side of the centre,

Digitized by Google

first skin nipple-like, shining. In regard to the scale, our insect does not very well agree with Morgan's account of *dictyospermi*, but there may be variation in this respect; in fact, Mr. Newstead has already indicated that there is, by describing the peculiar variety *arecæ*. It may be convenient also to distinguish the present form by a name, *jamaicensis*; so the varieties of *A. dictyospermi* can be tabulated thus:—

(1.) Scale elongate-oval, greyish-white, . . = *dictyospermi*, Morg.

(2.) Scale circular or nearly so, reddish or orange-brown.

(a.) Nipple-like prominence surrounded by a depression, beyond which is a strong circular ridge, . = *arecæ*, Newst.

(b.) Without any conspicuous depression or ridge, ... = *jamaicensis*, Ckll.

On examining the form *jamaicensis*, one can see the characters which, if much more developed, would give rise to *arecæ*; and there can be no doubt that if it should become necessary to make two species out of the above forms, they will be *dictyospermi* and *arecæ*, with *jamaicensis* as a variety of the latter.

A. mangiferæ, Ckll., from Jamaica, has a pale scale, more like that of typical *dictyospermi*; its affinity with *dictyospermi* is evident, and I should not be surprised if it ultimately becomes necessary to sink it under that species as a variety. Mr. Maskell, however, to whom I sent specimens of *mangiferæ*, wrote that the species appeared to him to be a valid one.

There is another scale insect, which in the female presents an extraordinary resemblance to *A. dictyospermi*, and that is *Diaspis pinnulifera*, Maskell, found in Fiji and Demerara. But the form of the male scale, as described by Maskell, will at once separate this from any *Aspidiotus*.

(5.) *Aspidiotus punicæ*, Ckll.—Jn. Inst. Jamaica, 1893, p. 255. The typical form of this species has the scale slightly raised, snow-white, with orange-brown exuviæ. The ♀ is almost circular, plump, orange with the hind end slightly brownish. In the orange, plump ♀, it resembles specimens of *A. rapax* found on guava. The median lobes are large and elongate, close together, and notched without; the second pair is small, the third practically obsolete. In the region of the lobes, but not beyond, are some scale like plates; and beyond the rudiment of the third lobe is a conspicuous spine. The margin, beyond, shows one or two spines. There are four groups of ventral glands.

In the specimens on cocoanut from Dominica (the type being from

Digitized by Google

Jamaica) the second pair of lobes was also practically obsolete. The ♂, from Dominica, has well-developed wings; it is dull yellow, with blue-black eyes.

So far, the species is distinct and easily recognized; but there are some allied forms, concerning which it is not easy to come to a sound judg. ment; I will discuss these under the head of *A. diffinis*.

(6.) *Aspidiotus affinis* (*diffinis*), Newstead. Ent. Mo. Mag., 1893, pp. 186, 280. This is evidently very near to *punicæ*, but it differs in its high, convex, greyish-brown scale, and in the absence of plates and grouped glands. The presence of grouped glands has been shown by Mr. Newstead to be an uncertain character in *A. sonatus*, Frauenf., and I have found it equally so in *A. destructor*, Sign., but the other distinctive features seem of importance.

There is a scale found in Jamaica, which I had named in MS. *Aspidiotus punicæ* var. *lateralis*, but which I now believe must be referred to *diffinis*. The following description will serve for its recognition :—

♀ Scale 1 mm. diam. or a little over, convex, rounded, circular, or nearly so, varying to oval, dull brownish-white, varying to brown, with covered brown exuviæ, resembling those of *punicæ*, but placed away from the centre. Scale leaving a white mark when removed from the plant.

♀ Nearly circular, terminal portion yellow, the rest variegated pink and blue in a peculiar manner. The lobes and plates as in typical *punicæ*.

♂ Scale smaller, elongate with rounded ends and parallel sides; exuviæ away from the centre.

Hab. on stems of *Jasminum pubescens*, Parade Garden, Kingston, Jamaica, Sept., 1892, collected by F. N. DaCosta.

It will be seen that this var. *lateralis* resembles *diffinis* in the scale, but differs in having distinct scale-like plates.

On a tree in East street, Kingston, Jamaica (not identified, but has pinnate leaves, leaflets 13, oblique, tips obtuse, emarginate), I found numerous scales which seemed also referable to var. *lateralis*. They were massed together on the petioles and stalks, mixed with a few *Asterolecanium pustulans*. The scales agree exactly with *A. diffinis* as described by Newstead, but most of them are parasitised, so that I could not get very good examples of the female insect. Little bright red mites were running about amongst them. The female, in this form, is bright yellow to pale yellow, not pink and blue as in the *Jasminum* specimens. The lobes are as in typical *punicæ*, and there are distinct, though narrow, serrate plates. I failed to see any groups of ventral glands.

Digitized by Google

For the present, it will suffice to distinguish two forms of *A. diffinis*, thus:—

(1.) Plates wanting; form inhabiting Demerara, = *diffinis*, Newst.

(2.) Plates present; form inhabiting Jamaica, . = *lateralis*, Ckll.

Whether these really constitute a distinct species, or should be considered varieties of *punicæ*, must be left for future decision. The name *punicæ* was published about three months before *affinis*, which preoccupied name was later altered to *diffinis*.

(7.) *A. biformis*, Ckll. This scale seems to be common on cultivated orchids in Jamaica and Trinidad; it should be looked for in conservatories in this country.

♀ Scale about 2 mm. diam., circular to broadly-oval, depressed, surface granulose; exuviæ nipple-like, dark red-brown, placed on one side of the centre. Colour of scale dark brown to black.

Conspicuous white patches are left when the scales are removed.

♀ With three pairs of lobes, the first two pairs moderately large, well-developed, with parallel sides; the third pair more or less rudimentary. Scale-like plates between the lobes. On the margin, cephalad of the lobes, is a pointed projection, having a spine on each side of it.

♂ Scales much smaller than those of the female, narrow, elongate, with the exuviæ at one end.

This species might be confounded with *A. ficus*, but the form of the male scale will distinguish it at a glance.

(8.) *A. juglans-regiæ*, Comst. Prof. C. H. T. Townsend, when Entomologist of the N. Mex. Exp. Station, found a species of *Aspidiotus* on some young plum trees at Las Cruces, N. Mex. The trees were thereupon destroyed, and the scale, which had evidently been imported, has not been seen in the neighbourhood since.

Some specimens, however, were preserved; and on examining them I concluded that they were *A. juglans-regiæ*. Not having any of that species for comparison, I sent a few of the Las Cruces scales to Dr. Riley, asking for his opinion. He kindly replied thus:—"The specimen which you send differs from Comstock's *A. juglans-regiæ*. It has four lateral rows of pores on the anal plate, while there are but three in Comstock's species. The fourth or external row in the New Mexican species is composed of about 20 pores, whereas in Comstock's it is composed of 3 to 8 only."

In these points it resembles Colvée's *A. juglandis*, which has the

Digitized by Google

four lateral rows of pores, and the external row composed of 16 to 18 pores.

A. juglandis is said to have the scale reddish, in the Las Cruces form it is brown, in *juglans-regiæ* pale grayish-brown. I have been much inclined to suppose that *juglandis* and *juglans-regiæ* are but forms of one species, but have not the material to prove the point. If so, our Las Cruces scale must belong to the same species.

For the sake of distinguishing our form, it may be well to describe it thus :—*A. juglans-regiæ* var. nov. *pruni.*

♀ Scale varying from very pale brown to decided brown, second skin sometimes dark brown. Exuviæ apparently covered by a fine layer of secretion, mostly rubbed off in our specimens ; second skin large, broadly oval or sub-circular, not pointed ; first skin more or less exposed, orange Shape of scale circular or nearly so ; diameter, 2½ mm.

♀ Yellow, oval. Median lobes rather large, blunt and rounded, close together, notched outwardly. Second lobes smaller but of fair size, also notched outwardly. Third lobes obsolete. Pairs of spine-like plates at intervals along the margin. Caudolateral groups of glands of from 5 to 7, cephalolaterals of from 6 to 7, median group represented by a single orifice.

♂ Scale, colour of ♀ scale, but smaller and elongate.

Hab. on twigs of plum, Las Cruces, N. Mex., May 8. (Townsend.)

I do not know any species with which this might easily be confounded, except *A. ancylus*, Putnam, which has a smaller scale, brick-red exuviæ, and the second pair of lobes obsolete.

Feb. 21.—I have just received specimens of *Aspidiotus juglans-regiæ*, Comst. from Prof. Morgan, of Baton Rouge, La. He sends it on peach and Japan plum, with the statement that "it is new in this section and is doing considerable damage."

Feb. 25.—Yesterday I found a new variety of *Aspidiotus juglans-regiæ* at Mesilla, N. Mex. :—

Var. nov. *albus.* ♀ Scale flat, 2½ mm. diam , white, with the exuviæ orange-red, but covered by white secretion. ♀ yellow, four rows of orifices marking the obliterated segments of terminal portion ; ventral glands present, median single, cephalolaterals 9, caudolaterals 10. Marginal spines and plates inconspicuous. On bark of pear trees, not very numerous.

Should this hereafter be considerd a distinct species, the varietal name now given may stand for it ; but notwithstanding the white colour, which seems quite constant in the Messilla specimens, I have no doubt in my own mind that the insect is a variety of *juglans-regiæ*, with which it appears to agree in all really essential characters.

Digitized by Google

A REPLY TO MR. W. H. EDWARDS.

BY H. J. ELWES, COLESBORNE, CHELTENHAM, ENGLAND.

I did not suppose that anything I wrote on North American Butterflies was likely to find favour in Mr. Edwards's eyes, but in a long criticism of my paper on *Œneis*, which I have just seen in the CANADIAN ENTOMOLOGIST, there are two or three points on which he has so much misunderstood or misrepresented me that I cannot pass them by, as I shall do the greater part of his remarks, as unworthy of notice.

As to the specific distinction of *Californica*, *iduna* and *gigas*, I could find nothing in Mr. Edwards's own figures or writings to guide me in separating them, and now I only see that he relies on Messrs. Wright and Fletcher, as he has seen none of them in life himself. It is quite possible that there is as much variation in the larva as in the imago, and if there is any invariable character by which they can be known apart, I am just as ready to admit it as in the case of *ivallda*. Only I must wait for Mr. Edwards to show it, which he has not yet done, so far as I am capable of judging.

Next, with regard to *Uhleri* and *varuna;* I quite admit that one and the same species of Œneis is not likely to fly on low, grassy plains and on alpine peaks, though I have taken both *Parnassius smintheus* and *Erebia epipsodea* in quite as dissimilar situations. But where did I say that *varuna* was found on alpine peaks? Kananaskis, though 4,000 feet above sea-level, is just such a grassy level valley in the mountains as *Uhleri* frequents in Colorado, and the elevation of 4,000 feet there is, with regard to timber line, equal to about 7,000 or 8,000 feet in Colorado—just the level at which *Uhleri* seems most abundant. It is *Uhleri*, as Mr. Edwards says, and so are the specimens found at other localities farther east in Alberta. If they have a difference sufficient to distinguish them it is for Mr. Edwards to define the range of both and give us something more definite than he has done as differential characters.

Now we come to *Æno* Bvd. a name which I have ignored, because I cannot identify it certainly with any species. Mr. Edwards, having adopted the name on other people's authority, feels bound, I suppose, to support it. But it is not consistent of him after doing so to refuse to recognize the much better evidence I have given for the identification of the name *subhyalina;* simply, as it seems, because he prefers to suppose that the type is not really the specimen described by Curtis. He says that it was described sixty years ago, and "in course of sixty odd years

Digitized by Google

the chances are against the survival of any particular cabinet insect! It has a hundred enemies besides the possibility of accident. It is not an unknown thing for the owner of a collection of insects, when a type is destroyed, to attach the label to another example that seems near or pretty near the original." Here, perhaps, we have an explanation of the reason why, as I have pointed out in my reply to his criticism on my paper on Argynnis (see CAN. ENT., Vol. XXII., p. 150), I never got any help from Mr. Edwards in identifying so many of his types. But we do not so use our types in Europe, and there is not the slightest reason for assuming, as Mr. Edwards has done on the authority of an anonymous correspondent, that the type of *subhyalina* Curtis, is not the insect described by him. It happens that there was a label in what I believe to be Guénée's handwriting to the effect that this specimen was the one described by Curtis; but suppose it was not, what ground has Mr. Edwards for applying the name of a species described from Arctic America (?) to a species now only known to occur on the high peaks of the Rocky Mountains of Alberta, and never re-found by any of the numerous Arctic expeditions which have been out since Ross's time, and have covered a good deal if not all the ground covered by him.

As to my *Œ. Alberta*, Mr. Edwards had better wait till he sees it before saying that it is *varuna*. If he cannot distinguish it from *varuna* by the description, it only shows that either his or our description is bad, and how does he know that the one sent him by Mr. Fletcher was the same species?

As to the identification of Mr. Fletcher's supposed female of *Macounii* taken at Morley, Alberta, I can only say that there is no question whatever of Mr. Fletcher's veracity, only, how can you tell female *Macounii* from female *nevadensis*? I referred this very point to Mr. Scudder when he was at my house last year, and he looked at the specimens and said he could not say, but thought that it was just as likely to be one as the other.

Lastly, Mr. Edwards says, and I quite agree with him, that the value of publications such as mine depends much on whether the author is thoroughly acquainted with his subject; and such acquaintance implies considerable experience as a lepidopterist and study of the forms he undertakes to speak of, etc., etc., and also an acquaintance with the behaviour, habits of flight and localities of the species, either from personal observation or reliable reports of thoroughly good observers. That is

Digitized by Google

just what I think, too, and I have made two journeys in the west, and a great many in Europe and Asia in search of this knowledge; whilst Mr. Edwards, so far as I know, has never seen an Œneis alive anywhere or any collection of them at all comparable with those I have seen and have studied specially before writing.

As to his criticism on the value of the clasper I do not think he has any practical experience of the matter, but I will leave Mr. J. Edwards to answer him on that point :—

"I desire to say something on so much of Mr. W. H. Edwards's criticism above-mentioned, as relates to the employment of characters derived from the male genitalia and the comparative table, as these are the points with which I was more particularly concerned in the preparation of Mr. Elwes's paper on *Œneis*.

"My business was simply to examine the material upon which the paper was based, and to ascertain how many kinds there were capable of definition with reasonable accuracy; and I endeavoured to give expression to those characters which separate any given kind from all the other kinds under review at that time, and to contrast these characters in a workable form in my "Conspectus specierum." The question of the soundness or otherwise of my work I am content to leave to the judgment of any competent students who may be disposed to make an honest attempt to determine described species of Œneis by the characters there laid down. A comparative table may be very useful to many students without necessarily pleasing everybody. Mr. W. H. Edwards gives it as his opinion that characters drawn from the male genitalia are valueless, but I find in practice that they have a value equivalent to any other morphological peculiarity, and that value is, of course, in direct proportion to their constancy in a series of individuals. Perhaps the best statement of the exact value of these characters, so far as Lepidoptera are concerned, is that by Prof. John B. Smith in his Revision of Agrotis (Bull. 38, U. S. Nat. Mus., p. 7.), which I quote here as it is well worth reprinting :—

'The study of the primary sexual characters is one of the most valuable guides in the recognition of species. The structures are within my experience absolutely invariable within specific limits, and species otherwise closely allied are sometimes well separated by these characters. They have proved invaluable in settling questions of the identity of American and European forms so closely allied as to be considered races, and in several instances they have proved the identity or distinctness of

Digitized by Google

species when superficial characters left it in doubt. It has removed individual judgment as a factor in many cases and allows a final appeal in cases of difference. There is no universal test character, however, and as with all others so sexual characters sometimes fail. Over one hundred species referred to *Carneades* have so nearly the same form of structure that there is no sufficient variation to have specific value in doubtful cases. In some other groups, however, no two species are alike, and the widest variance within generic limits allows definite specific limitation.'

"As I wrote the description of *Œ. Alberta* and the paragraph immediately following, I may be allowed to point out for the information of anyone who may be disposed to accept Mr.W. H. Edwards's statement that *Alberta* and *varuna* cannot be distinguished from each other, that the former *may* be distinguished from the latter (amongst other points) by the whitish veins on the hindwing below, the absence of fulvous colouring except on the hindwing above, and the presence of a tooth or projection near the middle of the upper edge of the clasp in the male; all which particulars appear, with others, in the description in question."

JAMES EDWARDS, Colesborne, Cheltenham, England."

April 2nd, 1894.

NEW NORTH AMERICAN HOMOPTERA, No. VIII.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

1. ATHYSANUS ANTHRACINUS, *n. sp.*

Allied to *A. plutonius*, Uhl. Deep, black, highly polished, tibiæ and tarsi of the anterior and intermediate feet yellow. Length, 3½ mm.

Head shorter and more rounded before than in *plutonius*, closely punctured. Vertex ⅓ longer on the middle than next the eye, sloping and strongly rounded to the base of the front, median carina very feeble; ocelli and two dots on the hind margin fulvous. Antennæ, the basal joint excepted, pale; about six obscure arcs on the front and the rostrum, excepting its tip, fulvous. Sides of the clypeus parallel, tip feebly rounded. Knees, tibiæ and tarsi of the anterior and intermediate feet pale yellow; slender hind edge of the ventral segments fulvous. Pronotum obscurely wrinkled, more prominently rounded before than in *plutonius*. Scutellum closely punctured. Elytra almost coriaceous, deep piceous black, shagreened; nervures inconspicuous. Wings deep smoky brown, nervures blackish.

Digitized by Google

Valve of the male rather large, rounded. Plates long-triangular, exceeding the pygofers, rounded at apex and armed with a few tawny marginal bristles. Last ventral segment of the female longer than the penultimate, feebly concavely arcuated either side, the lateral angles quite strongly produced, subacute; pygofers short and thick, blunt at apex and armed there with a few feeble bristles, a little surpassed by the oviduct.

Iowa, Kansas and Colorado. Described from one female and two male examples. The Kansan specimen was captured at Madison, by M. C. Van Duzee. That from Iowa I owe to the kindness of Prof. Herbert Osborn, and the example from Colorado is from Prof. C. P. Gillette. Prof. Osborn's specimen came labelled *Conogonus gagates*, Ashm., and in the National Museum is an example labelled *Scleroracus anthracinus*, Uhler. I have adopted Mr. Uhler's specific name as very appropriate for this deep black little Jassid, but I can find no characters to separate it generically from *Athysanus*. Its highly polished semi-coriaceous elytra are peculiar, but hardly constitute a generic character. This insect superficially resembles *Goniagnathus Palmeri*, but they are very distinct.

2. EUTETTIX JOHNSONI, *n. sp.*

Form of *Paramesus Twiningi*. Bright orange-fulvous maculated with white. Anterior edge of the vertex acute, marked above with six black points and below with an interrupted black line. Length, 4–4½ mm.

Head nearly as wide as the pronotum. Vertex flat, depressed, ¼ longer on the middle than next the eye, anterior edge acute. Front strongly narrowed below. Clypeus a little expanded toward the rounded apex. Pronotum not twice the length of the vertex, sides rather long, obtusely carinated; latero-posterior angles rounded. Valve of the male broad-triangular, apex truncated; plates broad and short, little more than twice the length of the valve, rounded behind with a short obtuse tip, heavily fringed with soft white hairs; pygofers short, truncated, with a few long white bristles. Last ventral segment of the female long, rounded, sinuated next the lateral angles, produced in a short acute tooth either side of a narrow acute median notch. Pygofers broad, tapering suddenly from the apex of the connexivum to the acute tip, which is somewhat surpassed by the stout oviduct, the sides nearly rectilinear.

Colour bright orange-fulvous, paling to almost yellow beneath and on the legs, and marked with yellow on the anterior edge of the vertex, apex

Digitized by Google

of the scutellum and more obscurely on the sides of the pronotum and tergum. Two spots on the base of the vertex, three longitudinal lines on the pronotum, the lateral broader and abbreviated before, the basal margin of the clavus, and about eighteen spots on the elytra, white; the latter coalescing in places, and forming about four transverse bands; the two transverse veinlets bounding the postnodal areole brown; nervures fulvous, rather strong. Wings faintly enfumed, highly iridescent, nervures brown. Anterior edge of the vertex with six black points, the two median approximate; base of the front with a black concentric line, crossing the temples and interrupted at the middle and below each ocellus. Claws and antennal setæ brown. Tibial spines deeper fulvous. Face with an obsolete pale median line.

The male is a little more deeply coloured than the female, and has the two inner transverse nervures beyond the apex of the clavus brown, and the wings are more deeply fuliginous.

Described from one male and two female examples taken at Philadelphia, Pa., by Mr. C. W. Johnson. This is, perhaps, the most delicately beautiful little Jassid as yet described from our fauna, and it affords me pleasure to dedicate it to Mr. Johnson, who has brought to notice many interesting forms of the *Jassidæ* from Eastern Pennsylvania and New Jersey.

This is the smallest species of *Eutettix* yet described. It has nearly the colour and markings of *Paramesus vittellinus*, and the size and form of *P. Twiningi*, and might readily be mistaken for a member of that genus, but the elytral neuration and most of its characters are those of *Eutettix*.

3. EUTETTIX CLARIVIDA, *n. sp.*

Form nearly of *Eutettix seminuda*. Pale greenish-yellow, anterior edge of the vertex with a distant pair of large black spots and two brown points at the apex. Length, 4½ to 5 mm.

Vertex hardly ¼ longer on the middle than next the eye, just ½ the length of the pronotum; marked with an impressed median line on the base, either side of which is the usual impressed area near the outer angle of the disc, and anteriorly is the transverse subapical depression common to this species of this genus. Front ¼ longer than wide, clypeus scarcely expanded apically; cheeks as in *seminuda*. Valve of the male broad-triangular, about the length of the last ventral segment; plates about twice the length of the valve, their outer edges distinctly arquated near

Digitized by Google

the base; pygofers exceeding the plates, obtuse. Ultimate ventral segment of the female rather long, hind edge rounded with a short, abrupt median projection or tooth, about twice as broad as long; pygofers broad, a little surpassed by the stout oviduct.

Colour: Entire insect pale greenish-yellow, polished, paler on the head and beneath, tips of the tarsal joints embrowned, extreme apex of the rostrum black, anterior edge of the head with a round black spot placed just above and within each ocellus, and two minute equidistant brown points between these on the apex. Mesonotum and sometimes the basal tergal segments black. Eyes brownish. Elytra subhyaline with strong yellowish nervures.

Colorado. Described from two male and four female examples received from Prof. C. P. Gillette. Except in its want of ornamentation this insect is closely related to *Eutettix seminuda*, Say, like which it approaches *Thamnotettix* in many of its characters. But its broader form, the characters of the vertex and the wide front will indicate its relationship.

4. CICADULA LEPIDA, *n. sp.*

Very near *C. diminuta*, Leth., but larger, with the front narrower and less tumid below, and with the clypeus broader at apex. Length, 3½ to 4 mm.

Colour pale yellow somewhat intensified on the abdomen and tinged with green on the vertex. Head marked with two points placed near the hind edge of the vertex about midway between the nearly obsolete median line and the eyes, two large transverse spots at apex, on the basal sutures of the front. A vertical mark either side between the ocellus and eye, about three very short frontal arcs, and a spot at base of the antennæ; all black. Eyes, frontal sutures below the antennæ, tips of the tarsal joints and a row of minute points at the base of the tibial spines, brown. Disc of the tergum, oviduct, claws and tip of the rostrum black. Elytra whitish, pellucid, faintly tinged with yellow at base and smoky at tip; nervures slender, pale yellow. Wings white. Last ventral segment short, hind edge entire, very slightly rounded; pygofers bearing a few white bristles at tip, scarcely surpassed by the oviduct.

Described from two female examples, Kansas, July, Prof. F. H. Snow. New York City, June, Mr. E. B. Southwick. Prof. Snow's specimen was taken at electric light, in Dodge Co., Kansas.

Digitized by Google

ZETHUS AZTECUS IN FLORIDA.

BY WM. HAMPTON PATTON, HARTFORD, CONN

ZETHUS AZTECUS, Saussure (Syn. *Z. Poeyi*, Sauss. and *Z. Slossonæ*, F.)

The male differs little from the female in colour (specimens from Indian River, Fla., Dr. Wittfeld); the described differences being all variations. The male clypeus is often black at base and in middle.

Saussure's description of *Z. aztecus* says, "fronte transversim in lineam elevato." Hence Fox's character of difference for *Z. Slossonæ* is incorrect, and the new name yields to *Z. aztecus*, Sauss.

Z. aztecus, having abdomen black, differs in this (and not in lacking a ridge above antennæ) from *Z. Slossonæ*, Fox.

Z. Poeyi, having abdomen red, agrees in this with *Z. Slossonæ*. The teeth of clypeus are variable.

The spiral antennal tip of *Poeyi* is not sufficiently invariable to hold this species distinct from *aztecus;* and the length of pedicle of second segment is variable in appearance. The colour (also variable) does not differ from *Slossonæ* to *Poeyi*. Hence I unite *Poeyi* to *aztecus* and add *Slossonæ* as a synonym. Occurs in Mexico, Cuba and Florida.

In *Zethus* four divisions are named in Saussure's "Synopsis":

Zethus, Sauss., second abdominal segment subsessile.

Heros, Sauss., clypeus lozenge-shaped, forming on each side an angle.

Zethusculus, Sauss., pedicle of second segment not more than one-fourth length of segment.

Didymogaster, Perty, pedicle of second segment at least one-fourth length of segment.

None of these divisions appear to be sufficiently distinct to be worthy of mention, even as sections. The length of pedicle of second segment is variable in the same species; hence, *aztecus* was placed in *Zethusculus* and *Poeyi* in *Didymogaster*.

Discœlius is a synonym of *Zethus*.

Digitized by Google

NOTE ON ACRONYCTA CRISTIFERA, WALK.

BY A. R. GROTE, A.M., BREMEN, GERMANY.

Thanks to the identifications of Prof. Smith with the British Museum collection which contains Walker's types, we have now a certainty as to the correct names of almost all our species. It is clear from different remarks in the catalogue that under Mr. Butler's rearrangement of the material some shifting of the specimens described by Walker has taken place, and this shifting has equally certainly led here or there to an accidental shifting of label. I suggest as a possible solution to the *Acronycta cristifera* mystery, that the specimen B. Mus. Lists, IX., 230, 1856, marked: "*W.* Orillia, West Canada, from Mr. Bush's collection," and determined as *Mamestra brassicæ* by Walker, may now figure as the "type" of *Acronycta cristifera*, Walk., and the real type of the latter, which I saw in its original place, may have become misplaced.

In 1881, before Mr. Butler had interfered with, or Prof. Smith had seen the British Museum Collection, I examined the sole specimen and apparent "type" of *Acronycta cristifera*, Walk. It was in fair condition, with clean cut wings and somewhat narrow and tufted body parts. It belonged to a species unknown to me, of a seeming peculiar northern type; the specimen was labelled as from St. Martin's Falls, Hudson Bay. I examined it carefully, and in my memory can see the specimen before me now. It was a dark stone-gray species, the concolorous primaries without any warm tinting shaded here and there with whitish, but quite obscurely, and allowing the usual lines and narrowly outlined stigmata to be clearly made out. The stigmata were defined and nearly concolorous, not contrasting. The insect reminded me mostly of the species described by Morrison as *Acronycta aspera*. I judged the specimen to have naked eyes, but had no opportunity of verifying this. The hind wings were concolorous, perhaps a little darker. There was not a trace of any reddish-brown, or brighter shading or colour. The whole insect was of a stony, somewhat fuscous or sordid dusty gray-hue. In my Illustrated Essay I noted this examination of mine as follows: "The type from Hudson Bay is not an *Acronycta*. The abdomen is tufted; the species is dark stone-grey, with kidney-shaped reniform, and seems a Hadenoid form unknown to me," l. c. 38. Under these circumstances I was greatly surprised to find by Prof. Smith's Revision that Mr. Butler had referred the specimen as belonging to *Mamestra lubens;* still more so that Prof.

Digitized by Google

Smith afterwards confirms the decision. That the specimen considered by Butler and Smith to be the "type" of *cristifera*, Walk, is really *lubens*, I do not doubt. But that this specimen was described by Walker and seen by me, I do not only doubt, but I shall try to show the impossibility of. Let me premise that, so far as I can find out, in every case where I have positively identified Walker's species, after seeing the Brit. Mus. Collection, my identification is adopted and verified afterwards by Prof. Smith, as a study of his synonymy will show. In every case but this; for even where, from the poor condition of the specimen, I only ventured to suggest the identity, as with *A. muraenula*, the supposition is confirmed. Let me also premise that, in the search for "types," Prof. Smith has not stopped to verify the supposed "type" by the description. Yet the description is the sole real authority for the authenticity of the "type." A number of times have I, in print, drawn attention to this fact, that when a supposed "type" contradicts the published description, the "type" must be held to be spurious. Not only does literature bring ample evidence that "types" have been subsequently made, but a mistake in labelling, a changing of the label, may not infrequently occur, and has often occurred as the result of accident. We may go further and say that a description must tolerably well conform to the appearance and character of the specimen, to be accepted as having been drawn up from it. But, in the present case, we may waive all such argument, weakened as it must be by Walker's poor descriptive methods. The description of *cristifera* simply contradicts the supposition that a specimen of *lubens* could have served for its basis. It bears out my independent testimony, written without consulting the B. Mus. Lists, that a sordid, dusky or "brownish" gray insect, without any brighter colouring, was before Mr. Walker. Accessory evidence is that *lubens* is not, so far as known, a northern species at all, not else known in the Hudson Bay collections; while the form I saw had the northern aspect of *Polia aspera*. Again, Mr. Walker's generic references are wild, but there is still some method in them. A moth to be referred by him to *Acronycta* must have something gray, black and white, about it, to say the least. Now *lubens* is not gray after this fashion. It is more brown than gray. It is very dark grayish with generally over all a distinct reddish flush and tinge, especially basally. The reniform spot is upright and yellowish, not kidney-shaped. Beneath it is even brighter coloured, tinged with carmine or bright red. The hind wings are not gray or "cinereous" at all, but

Digitized by Google

fuscous or smoky. The size is larger. *Lubens* is also altogether a comparatively gaily coloured Noctuid, with violet and purple-brown shadings. It recalls somewhat *Copimamestra brassicæ*, but not in any way does it resemble a dead stone-gray species, unicolorous in appearance. The lines are partly yellow; they cannot be described as "black, undulating and denticulated." The type I saw allowed the fine lines, single, if I remember rightly, to contrast and appear as if cut in the wing against the even paler ground colour. The reniform was wide, kidney-shaped, excavated outwardly. But let Mr. Walker speak for himself. That he described *Mamestra adjuncta* and *Xylomiges crucialis* as Acronyctas is true, but these have at least something of the *Acronycta* livery and colours. *Lubens* has nothing of this, and is well described by Smith in the Revision, p. 233, under *cristifera*. To this I can refer the reader. Here is Walker's description from the British Museum Lists, XV., p. 1654, 1858. The Latin diagnosis I can omit, since it merely translates the English text:

"Male.—Dark cinereous, brownish beneath. Thorax with black bands. Abdomen brownish-cinereous, with high black dorsal crests, tufted along each side, and with a large apical tuft. Forewings with some whitish hairs here and there, with black undulating and denticulated lines; orbicular and reniform spots and a third hindward spot mostly whitish; orbicular large, nearly round; reniform slightly excavated on the outer side. Hind wings brownish-cinereous, with whitish ciliæ. Length of the body 7 lines; of the wings 16 lines. This species much resembles *A. humamelis*, but is sufficiently distinct. *a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by Dr. Barnston."

Walker's comparison with *Acronycta hamamelis*, though wide of the mark, is only justified by the *Acronycta*-like gray of his "type," which wanted all warm *Mamestra*-like reddish-brown tints. He calls a dark or dusty fuscous-gray, a sordid stone-gray, "brownish-gray." There is not the faintest resemblance to *lubens* in his description, in which species the orbicular is dark centred, and in which character Walker's "type" agreed with his description in being without dark centre merely somewhat paler, more "whitish" than the wing. The type of *cristifera* was not rough and powdery like *lubens*, but nearly smooth. Could any sane entomologist compare *lubens* with *hamamelis*? I think not. There was no trace of purple, yellow, bluish-gray, violet, carmine or reddish-brown in Walker's

Digitized by Google

"tvpe," and there is none in his description. The type I saw of *cristifera* was evidently a male; what is the sex of the supposed "type," the specimen of *lubens*?

Walker's descriptions, though inadequate throughout, do not ever necessarily contradict his material. They generally vaguely agree, and though inadequate for identification are often sufficient as to the colour and markings of his specimens. With structure he was profoundly unacquainted in the Lepidoptera. But, while making every allowance possible, I submit that he never could have drawn up his description of *cristifera* from a specimen of *lubens*! It is rather his weakness to exaggerate, by not defining, small matters of shading in these sombre insects. He could not have failed to note the centrally spotted orbicular, the "creamy-yellow" upright reniform, the distinctly outlined claviform, the red flush, the blue-gray powderings, the yellowish subterminal line, the carmine tint beneath of *lubens*. Some trace of all these must have appeared in his words. There is none at all! He had a slighter *Polia*-like insect before him, which I saw, but could not locate definitely in my brief study. This specimen must in some way have become exchanged for a specimen of *lubens*, which may now stand there, but cannot in reason be considered his "type" of *cristifera*. I pass over what I believe is the fact, that Walker did not put the word "type" on a label attached to his specimens and that therefore, in rearranging the material, a mistake might readily occur. Were I to see his real "type" of *cristifera*, I should recognize it at once. Error is not out of the question because *lubens* is so strongly marked, as Prof. Smith would have us believe. The "error" is not as to the species, but as to the specimen! Why does not Mr. Smith study the British Museum Lists? Why adopt as infallible the testimony offered by the fact that the specimens in place *now* in the British Museum are really in every case Walker's identical "types"? Is there no margin for error here? It would seem that Prof. Smith has throughout adopted the theory that the specimens shown him as Walker's "types" must and are really always what they purport to be. Yet I have shown in this case that it may not always be so. I can put aside the fact that it is very unlikely that I should have been deceived in the case of so prominent a species, which, as Prof. Smith says, "must have been familiar" to me. Undoubtedly *lubens*, Grt., was well known to me, known as long as most of my moths. For a time, till 1875, I thought the species might be what what was called "*brassicæ*" in Europe. Is it not possible that this iden-

Digitized by Google

tical "type" of Walker's was what he called *brassicæ?* I have not the literature at the moment to refer to. It has no immediate bearing on my conclusion, which is this, that the species I have named in American collections *Mamestra lubens* must retain its name.

I do not belong to the school which would ignore the British Museum Catalogue altogether. As much as any one I have worked out Walker's species and generally adopted his names when earlier. It is true I lose more than any one else by Walker's insufficient descriptions. I do not object to this, for the reason that our main need is a stable nomenclature. This latter cannot be established by the procedure of taking a specimen as Walker's "type" which does not answer his published description. The real basis for our nomenclature is our literature. If *lubens* is dropped for *cristifera*, then this basis is fundamentally attacked. What is called a "type" supersedes it. But labelling a specimen can never constitute a publication. Walker's text must conform always and in every case sufficiently with his supposed "type," and at least not contradict it. In this case the description does not conform and does contradict the assumption of Mr. Butler. There may be other cases, but I have no means to look into them. I am quite willing that Walker's names should be restored and credited to him as if he had fully described his material. That so many of my species should be thus drawn in, is certainly no fault of mine. The labour of comparing Walker's "types" is no greater than than that of determining any other lot of specimens; but the labour used in trying to make out his descriptions will in almost every case be always in vain. After I had satisfied myself of this in 1868, I ceased to trouble myself to look through the Catalogues for a possible identification, which, in the best case, would be a doubtful one. It was much better to write recognizable descriptions of our Noctuidæ and run the risk with Mr. Walker. And when all is restored that can be restored to Mr. Walker, it may, I think, be said of my work with justice, that at a time when we in America had no names at all for our Owlet moths, I built up gradually a nomenclature which, for the greatest part, will endure.

Two other points remain to be elucidated. I am persistently credited by Prof. Smith with the description of *lorea* under the name *dodgei*. I have not the literature, but my memory is that I never described such a species, but that Mr. Morrison did. The last point relates to the type of *ferrealis*. I received this from Morrison's late Montana collections. It is very

Digitized by Google

distinct from *M. stricta (ferrea)*, and I think the type must now be with Mr. Neumoegen. It should be easily recognized. Prof. Smith has seen the types and recognizes the validity of twenty-nine (29) species of N. Am. *Mamestra* described by me. There remains then *lubens* to be reinstated and *ferrealis* to be again recognized, making thirty-one in all. I have lost four others through comparisons with Mr. Walker's "types."

FOLDED WINGS IN FŒNUS.

BY WM. HAMPTON PATTON.

Aside from the wasps distinguished by their folded wings (DIPLOPTERA) and the Chalcidian genus *Leucospis*, there is no record, unless of distant date, of any Hymenopterous insect having the wings folded. In *Coptera* the "longitudinal fold" described by Say is in reality a pleat or ridge: the wings, as I have repeatedly observed in the living insect, being laid flat upon the back and never folded.

I can, however, add from personal observation the Evaniad genus *Fœnus*, in which I have uniformly found the wings folded in a manner homologous to that of the hornets and *Leucospis* (*i. e.*, longitudinally through the middle, the fold crossing the median transverse vein and the two recurrents, the posterior half of the wing falling under the anterior half).

The position of the wing-fold is one of great morphological significance, as it indicates the line of separation between the two systems of veins in insect wings. The discovery of this fold in Evaniadæ proves the recently discovered relationship between these insects and the Diplopteryga.

On the eighth of May, 1879, at Waterbury, Conn., I bred a female specimen (of the common small species of *Fœnus*) from a larva found in the pith of a dead sumach twig in the preceding month. As no description of the larva of this genus exists, it is doubtful whether the larva found was that belonging to the Hymenopteron or was that of its host. The larva was apodous, of a very slight purple shade, and covered with fine down. There was no cocoon. The pupa is gray, the cast skin almost white, showing the peculiar features of the genus *Fœnus*.

Digitized by Google

BOOK NOTICE.

MISCELLANEOUS ENTOMOLOGICAL PAPERS. BY F. M. WEBSTER: Feb., 1894.

We have just received a neat pamphlet of 59 pages, which forms Bulletin 51 of the Ohio Agricultural Experiment Station. It is by Prof. F. M. Webster, and, like all his work, shows careful preparation.

The insects treated of in the first part are :—The Asparagus Beetle, the Western Corn Root-worm, the Broad-striped Flea-beetle, Blister Beetles, the Basket Worm, the Cabbage Aphis and the Apple-leaf Louse.

An interesting account of the insects which have been introduced into the State is given under the head of "Some Insect Immigrants in Ohio." There appear to have been two great highways which insects imported from Europe have followed : those which have entered the State at its north-eastern corner and spread westward, and those from Southern Europe which have generally entered by the way of the Ohio Valley and have a more or less restricted northern distribution.

In the article "Insect Foes of American Cereals" the writer is evidently dealing with a subject of which he has made a special study. By patient observation and the application of practical common sense, Prof. Webster has made some important discoveries in Economic Entomology. Not the least of these is the fact recorded in this pamphlet that the Apple Aphis passes part of the year as an injurious enemy on wheat. In fact Mr. Webster says : "So far as my observations go, it is more detrimental to the wheat than to the apple." This is an important discovery, and will doubtless draw the attention of entomologists to this important subject of the "Alternation of Generations" among the Aphides—a line of investigation which has engaged much of the time of Messrs. Riley and Howard at Washington. Speaking of remedies, Prof. Webster says : "It would appear almost visionary to advocate spraying apple orchards with kerosene emulsion in mid-winter to protect the wheat crop, but nevertheless one of the most serious enemies of young fall wheat passes its egg stage on the twigs of the apple during the winter season. I refer to the Apple-leaf Louse, *Aphis mali*, Fab."

"Soon after the young wheat plants appear in the fall the winged viviparous females of this species flock to the fields, and on these give birth to their young, which at once make their way to the roots, where they continue reproduction, sapping the life from the young plants—

Digitized by Google

* * * * though they are seldom killed outright, these infested plants cease to grow, and later take on a sickly look, and not until the Aphis abandons them in the autumn to return to the apple, do they show any amount of vigour. It is very seldom that the affected plants fully recover at least in autumn; and the result must be to reduce their productiveness the following year." The eggs of the Apple-leaf Aphis are deposited on the twigs and limbs of apple trees late in the autumn; these do not hatch until the following spring; the plant-lice remain on the apple trees for two or three generations, when winged females are produced, which fly to grasses and weeds and there pass the summer. After the young wheat is up in the autumn, the lice congregate on the plants and reproduce rapidly.

The above is briefly the life-history of this insect in Ohio as worked out by Prof. Webster by careful experiments, which are detailed in the Bulletin. At Ottawa this probably may also, to a large extent, be the case; but the Aphis is also sometimes abundant on young apple trees right through the season. It is, however, seldom injuriously abundant in Ontario, although in British Columbia it is to-day one of the most serious enemies of the apple grower.

Professor Webster's papers will doubtless cause many other entomologists to study this insect more closely, when it is probable that further discoveries will be made, perhaps not less interesting than that now discussed. J. F.

CORRESPONDENCE.

BELLURA DIFFUSA.

Sir,—In Dr. Smith's catalogue of the Lepidopterous superfamily Noctuidæ, found in Boreal America, on page 181, under *Bellura diffusa*, Grote: he states, "I have not seen the type of this species." In the March No. of CAN. ENT., Vol. 26, p. 85, referring to that statement, Mr. Grote says, "Where my type is now I cannot for the moment recollect. It seems not to be in the British Museum." When Mr. Grote, then of Buffalo, identified my specimen, he expressed pleasure at seeing the species again, remarking that he had not seen it since he had first named it; which I understood from what he said was about a year previously, indicating that it was not then in his collection. And the impression left on my mind from his conversation was, that he had seen but one specimen before, and that he had returned it after naming it. All this is distinctly impressed upon my memory, right or wrong, and my stating it may assist Mr. Grote in recalling the transaction, and give him a clue to where the type is now to be looked for. J. ALSTON MOFFAT.

Mailed May 3rd.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, JUNE, 1894. No. 6.

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

I. The Cicindelidæ of Ontario and Quebec.

[The following is the first of a series of papers which Mr. Wickham is specially preparing for this magazine. It is intended that they should treat of all the more conspicuous families of Coleoptera and present in tabular form the genera and species that are found in the Provinces of Ontario and Quebec; a descriptive list will also be given of the species, so far as known, that are to be found in the other provinces of the Dominion of Canada. The object in view is to assist collectors who have hitherto been unable, from the want of books or other causes, to identify the beetles they have caught, and to encourage them in the study of this most interesting order of insects. As many illustrations as possible will be given, and every effort will be made to render the papers thoroughly helpful to those who make use of them. It is hoped, also, that the aid thus given will lead on many of our younger readers to become students of Entomology, rather than mere collectors. The bibliography at the end of each paper will be of service to those who are not content to remain "beginners."—Ed. C. E.]

The beetles of this family are among the first to attract the attention of the collector. Their graceful forms, bright colours, and activity displayed in the pursuit of their prey, on sunny banks or roadsides, render them at once objects of interest and beauty; as much on this account as because of their generally conceded position as the highest of Coleoptera, they are given the first place in this series of articles.

For our purpose the Cicindelidæ may be defined as predaceous ground-beetles, with eleven-jointed filiform antennæ, which are borne on the front above the base of the mandibles. Two genera are represented in the Dominion of Canada, one of which, *Omus*, is confined to the Pacific provinces. It is distinguishable from *Cicindela* by having small eyes and separate posterior coxæ, while in the latter genus the eyes are large and prominent and the posterior coxæ contiguous.

Digitized by Google

Fig. 11.

The larva of Cicindela (fig. 11, *C. vulgaris*) is a somewhat elongate, whitish grub, with a broad, metallic coloured head and prothorax, and a large hump, bearing two hooks, on the fifth abdominal segment. They excavate holes in sunny spots and lie in wait for prey, with the head closing up the mouth of the burrow; when an insect comes within reach it is seized by the long jaws of the larva and the juices extracted. I am now rearing larvæ of *C. limbalis*, Klug, which I dug from holes in a clay bank on the fifteenth of April. They are easily kept in little tin boxes with damp earth, and feed readily on soft-bodied larvæ of wood-borers. The pupa is figured by Letzner * and is represented as bearing on the fifth abdominal dorsal, two long spines corresponding to the hooks on the same segment in the larva.

The perfect insects are to be found in all parts of North America south of the sixtieth parallel, or at least extend very nearly that far north, though more numerous in warm climates. The colours are usually metallic, the elytra more or less spotted and banded with white. When these markings are of the style shown in the figure of *C. hirticollis* (fig. 16) they are said to be *complete;* if, as is sometimes the case, they are reduced to partial obliteration or breaking up of these bands, they are called *incomplete.* The curved mark on the shoulder is known as the humeral lunule, the one at the tip the apical lunule, while the long bent mark extending nearly across the middle is called the median band. An important character, which is to be used in assigning species to their proper places in the table, is to be found in the labrum or upper lip; in most of our species it is short, but in *C. longilabris* it is very long. The free edge is variously toothed in the Canadian species. The legs furnish no characters that we can employ with profit, but it will be noticed that the males have three joints of the anterior tarsi dilated and silky pubescent beneath, the middle tibiæ being pubescent on the outer side.

Of the twelve tiger-beetles reported from Ontario and Quebec, the following five are considered varietal forms only:—*C. Lecontei* figures as a variety of *scutellaris*, *limbalis* and *splendida* both belong to *purpurea*, *generosa* is an Eastern form of *formosa*, and *12-guttata* is subordinate to *repanda*, being simply a variety in which the bands are broken up. The variety of *longilabris*, which is called *perviridis*, is known from Newfoundland, but I think not from the provinces which are directly the

* Zeitschr. f. Entom. Breslau, 1848, Taf. 2. *(C. campestris.)*

Digitized by Google

subject of this paper. They may be separated among themselves as follows, though occasionally forms will be found which intergrade between varieties to such an extent as to render it difficult to place them correctly from description alone. The arrangement followed is practically that of Schaupp, with such additions and alterations as were rendered possible or convenient by the smaller number of species here treated.

CICINDELA, Linn.

A. Labrum very long, one-toothed. Thorax flattened, trapezoidal.
Dull brown or black above, front of head excavated. Elytra distinctly punctate, usually with a slightly bent, nearly transverse median band, and three spots on or near the margin which is not bordered with white.....*longilabris*, Say.
Green above and beneath, humeral lunule complete.....*perviridis*, Schaupp.

B. Labrum short or only moderately long. Thorax not greatly flattened, quadrate or trapezoidal.

b. Thorax much narrowed behind; colours usually bright, either purplish, green, blue or coppery. Markings often very much reduced or incomplete.

c. Elytra without well-defined median band.
Markings marginal only, colour purplish-coppery, elytra indistinctly punctured, front of head sparsely pilose.....*Lecontei*, Hald.
Markings consisting of small white or golden dots, usually marginal only, but discal ones are often present. Colour bright green. Elytra distinctly punctured, front of head not pilose.....*sexguttata*, Fab.

cc. Elytra with median band distinct. Front of head pilose.
Thorax and elytra coppery or greenish coppery, margin green. Body beneath bluish-green. *purpurea*, Ol.
Thorax and elytra purplish, body beneath blue.....*limbalis*, Lec.
Thorax green or blue, elytra coppery, body beneath green or blue.....*splendida*, Hentz.

bb. Thorax slightly or not at all narrowed behind. Colours sober, brownish with white markings which are usually complete.

d. Markings complete, very broad, connected at margin. Body very hairy, labrum three-toothed. Humeral lunule oblique posteriorly.....*generosa*, Dej.

Digitized by Google

dd. Markings narrower, complete or incomplete. Humeral lunule with the posterior extremity much prolonged *backward* and but little curved. Labrum three-toothed..... .....*vulgaris*, Say.
Humeral lunule with the posterior portion incurved; marginal white line not extending quite to this lunule. Markings complete, not broken. Labrum one-toothed.....*repanda*, Dej.
Humeral and other markings broken up..*12-guttata*, Dej.
Humeral lunule with the posterior portion very suddenly turned inwards, at right angles to the suture or nearly so. Marginal white line connected with humeral lunule.....*hirticollis*, Say.

bbb. Thorax subcylindrical. Markings almost absent. Slender, black, shining, a row of large greenish foveæ near the suture. Apical lunule complete, the other markings usually very much broken or wanting. Labrum one-toothed.....*punctulata*, Fab.

Fig. 12.

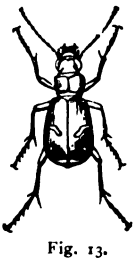


Fig. 13.

Fig. 14.

Fig. 15.

Fig. 16.

We offer figures of several species, as follows:—*Cicindela sexguttata* (fig. 12), *C. purpurea* (fig. 13), *C. generosa* (fig. 14), *C. vulgaris* (fig. 15), and *C. hirticollis* (fig. 16).

By request of the Editor, a list of other species and varieties reported from the Dominion is subjoined, with localities. They are not included in the table because they are not known from Old Canada, and our knowledge of the fauna of the great region north of the forty-ninth parallel and west of the ninety-fifth meridian is too limited to permit of a synoptic treatment of any completeness. For several unpublished records I am indebted to the kindness of Mr. Harrington and Mr. Fletcher, who sent me lists of the species contained in their collections.

Digitized by Google

The species are :—

Omus dejeanii, Reiche. B. C., Van. Isl. A large back insect, 18 to 20 mm. in length, the elytra marked with rather deep, irregular foveæ.

O. Audouinii, Reiche. B. C., Van. Isl. Resembles the preceding, but the size is less (13 to 18 mm.) and the elytra simply irregularly punctate. The species of Omus do not resemble Cicindela in appearance, but approach rather the Carabidæ, from which they may be easily separated by the antennal characters.

Cicindela longilabris, var. *montana*, Lec. Resembles *longilabris* proper, but is black, shining, smoother, the markings absent or only a slender median band present. Has been found in the Northwest Territory. J. B. Tyrrell (teste Harrington).

C. scutellaris, var. *unicolor*, Dej. Like *Lecontei*, but green or blue, without marks of any kind. Taken by J. B. Tyrrell in the Northwest Territory.

C. sexguttata, var. *patruela*, Dej B. C., Rev. Geo. W. Taylor. This is a variety of *sexguttata* in which the middle band is more or less distinct.

C. purpurea, var. *decem-notata*, Say. This is a form in which the middle band is more deflexed than in typical *purpurea*. The elytra are ordinarily ornamented also with four white dots. B. C. (teste Leconte).

C. formosa, Say. Fort McLeod (teste Fletcher), also in N. W. T. This is like *generosa*, but the ground colour is reddish cupreous instead of brown.

C. hyperborea, Lec. Methy Portage, H. B. T. (teste Leconte). I have never seen this species. It is rather small (12 mm.) reddish cupreous with markings somewhat resembling *vulgaris*, but the hinder portion of the median band is straight instead of being curved.

C. vulgaris, var. *vibex*, Horn. Vanc. Isl., Rev. G. W. Taylor (teste Harrington). A green variety of *vulgaris* in which the median band does not reach the margin.

C. oregona, Lec. A variety of *repanda*, brownish-bronze or olive, middle band not dilated on the margin. White dots large, lunules interrupted. B. C, Van. Isl.

C. pusilla, Say. Hudson's Bay Terr. (teste Schaupp). A small black species, (12 mm.) blue or greenish beneath, with tibiæ pale at base, labrum three-toothed. Elytra with faint basal and apical lunule and recurved median band extended on margin. All but the marginal part of this band is sometimes wanting. Unknown to me.

Digitized by Google

C. pusilla, var. *terricola*, Say. Black beneath, differs from typical form in having oblique punctures on the elytra, the anterior margin of each puncture being the higher. Hudson's Bay Terr. (teste Schaupp).

C. cinctipennis, var. *imperfecta*, Lec. A small species, 11 to 12.5 mm., brown above, the elytra with a long humeral lunule, which is usually connected with the median band. The median band does not touch the margin and its outer part is sometimes connected with the apical as well as the humeral lunule. B. C., A. J. Hill (teste Harrington).

C. lepida, Dej. Elytra white with a few green or bronzed lines. Anus testaceous, labrum one-toothed. Northwest Territory (teste Harrington).

It is to be hoped that the readers of the CANADIAN ENTOMOLOGIST, who have the opportunity to add other species to the lists of beetles of the Dominion, will take care to see that the records of their captures are published, as only in this way can faunal papers be made complete. Personally, I should be very glad to see any Cicindelas which appear not to come under the species mentioned in this article, whether in duplicate or otherwise. To those who wish to pursue the study further, the following works are recommended as containing nearly all that is known on the Cicindelidæ of North America :—

1818. Say, Thos. A monograph of the North American insects of the genus Cicindela. Trans. Am. Phil. Soc., N. S., I., 401-426. Reprinted in Leconte's Edition of the Complete Writings of Thos. Say, Vol. II., pp. 415-435, Boston, n. d.

1856. Leconte. John L. Revision of the Cicindelæ of the United States. Trans. Am. Phil. Soc., 2nd Ser. XI., pp. 27-62, Pl. I.

1876. Horn, Geo. H. The sexual characters of North American Cicindelidæ, with notes on some groups of Cicindela. Trans. Am. Ent. Soc., V., pp. 232-240.

1878. Horn, Geo. H. Descriptions of the larvæ of the North American genera of Cicindelidæ * * * Trans. Am. Ent. Soc., VII., pp. 28-37, Pl. II.

1878. Schaupp, F. G. On the Cicindelidæ of the United States. Bull. Bklyn. Ento. Soc., I., pp. 11-14, with a plate.

1883. Schaupp, F. G. Synoptic tables of Coleoptera. Cicindelidæ. Bulletin Brooklyn Ento. Soc., VI., 73-108, Pl. 1-5. This is the latest work on the subject, and gives descriptions, with coloured figures, of all species and varieties known from North America.

Digitized by Google

THE BUTTERFLIES OF LAGGAN, N. W. T.; ACCOUNT OF CERTAIN SPECIES INHABITING THE ROCKY MOUNTAINS IN LATITUDE 51° 25′.

BY THOMAS E. BEAN, LAGGAN, ALBERTA.

(Continued from page 149, Vol. 25.)

ARGYNNIS APHIRAPE, VAR. OSSIANUS, HERBST.

My local material allied to the European *Aphirape* consists of 22 males, 11 females. These have been studied in comparison with 3 ♂, 1 ♀ typical *Aphirape* from Germany, 2 ♂ 2 ♀ *Aphirape* var. *Ossianus* from Northern Finland, 1 ♂ *Ossianus* from Sweden, 1 ♂ 1 ♀ *Aphirape* var. *Triclaris* from Labrador, and 3 ♂ 1 ♀ *Triclaris* collected by Mr. H. K. Morrison in southern Colorado. In the local series the following relationships are displayed:—One male is *Triclaris*, agreeing closely on upper surface with the Colorado males, but on the under side nearer to the single Labrador male. Five males and four females are *Aphirape* var. *Ossianus*. The remaining 16 males and 7 females are of an intergrade type, combining features of *Ossianus* and *Triclaris*. On under side these compare closely with my Labrador pair of *Triclaris*, having the spots of secondaries mainly surfaced in nacre and very conspicuous. On upper side, however, they are distinctively of the *Ossianus* type.

Triclaris is by some authors considered a distinct species. The examination I have now made results adversely to that view. As above shown, the Laggan material contains over 25 per cent. of examples which are formal *Ossianus*, with about 75 per cent. of specimens combining the character of *Ossianus* upper surface with an extreme degree of *Triclaris* quality below. In order to make a reasonable plea for the distinctness of *Triclaris* from *Aphirape*, it would be requisite to prove that *Ossianus* and *Aphirape* in the European fauna are mutually independent. For *Ossianus* certainly is a resident in the bogs of Laggan, and just as surely the Laggan intergrade series identifies *Triclaris* with *Ossianus*.

In the Laggan series appears nothing very close to typical *Aphirape*. In fact, 75 per cent. of the Laggan occurrence is at the farthest point of separation from *Aphirape*.

Triclaris of Colorado is the North American form nearest to typical *Aphirape*, which it greatly resembles on upper side, and the Laggan form as markedly resembles *Ossianus*. It is also worthy of special note that in *Triclaris* of Colorado, as in typical *Aphirape*, the colour-pattern is

Digitized by Google

emphatically differentiated for sex ; while in the Laggan occurrence, as also in *Ossianus* of Europe, the sexes differ but slightly in appearance.

Ossianus flies at Laggan during July, or in forward seasons makes its appearance the last week of June. My earliest date for the male is June 22 (in 1888, an early season). It is found at altitudes from 4,900 to 5,600 feet, usually in marshy places. It is not common anywhere in the district, but occurs more freely than elsewhere in two subalpine bogs about a mile south of Laggan, at 5,400 and 5,500 feet. I have taken the female at Stephen, B. C., (5,290 feet), and the male at Emerald Lake (5,600 feet). At Emerald Lake occurred also the single instance of formal *Triclaris* previously mentioned.

A METHOD OF SECURING MOTHS' EGGS.

BY JOHN B. LEMBERT, YO SEMITE, CAL.

A practical way of procuring moths' eggs came under my observation last season and the season before, through an *Arctia ornata* ♀ that I sent to Mr. Dyar while he was in Portland, Oregon.

When I take an *Arctia ornata* ♀, and she is ready to lay eggs, the moment she shows signs of being stupefied in the Cyanide bottle I take her out, close the wings over her back, and place her in a paper envelope ; as soon as she revives, she will commence to scratch the paper with her legs ; I then shake the envelope, and if she has given up some eggs, I take them out, give her another dose of Cyanide fumes, and when she revives a second time I have found as many as 125 eggs in the paper. After she has given up this quantity the ♀ usually dies, even when left to her own ways and means, and I have found them dead as perfect as when they had just issued and were alive.

Euchaetes sciurus, *Arctia rufula* and *Spilosoma vestalis* will give up eggs in this way also, and die like *Ornata*.

A *Lepisesia Clarkia* ♀ has given up an egg in the Cyanide bottle, but as it is so easily killed by the Cyanide fumes, I never tried to get eggs from it in that manner.

Of butterflies, the *Colias Behrii* ♀'s have given up one and two eggs at a time in this way. The method can no doubt be improved on, and, by careful manipulation, the eggs of a great number of butterflies can be obtained in a short time by those intending to rear larvæ, and where the food-plant is known it will make work so much easier for the entomologist.

I my remark, also, that in a tube the eggs of *Spilosoma vestalis*, without the aid of any plant moisture, take about three weeks to hatch, as do also those of *Arctia ornata*, if not longer.

Digitized by Google

NEW CYNIPIDAE.

BY C. P. GILLETTE, FORT COLLINS, COLORADO.

RHODITES, Hartig.

R. AREFACTUS, *n. sp.*

The galls are dense, corky enlargements of small shoots, usually close to the stem from which the shoot arises, and the shoot is usually dead beyond the gall when the latter is mature. The galls are irregular in shape, vary from one-half to seven-eights of an inch in diameter, and are polythalamous. The surface is of a rusty colour, is finely wrinkled, and reminds me of dried fruit. The surface appears dry and hard, but it is easily dented with the finger-nail and is always free from spines.

Described from eighteen galls collected in March in the vicinity of Fort Collins, Colorado. Galls brought into the laboratory March 7th, began giving flies March 23rd.

Gall-flies.—Females—General colour, cinnamon-rufous; head entirely rufous, except a blackish area between either compound eye and the mouth; under a power of 60 diameters the lower face appears rather coarsely wrinkled, the wrinkles converging towards the mouth, the upper face, vertex and occiput very finely rugose; the face sparsely set with a short gray pubescense; antennæ short, the first three joints, and sometimes the base of the third, rufous, the remaining joints black; number of joints, 14. *Thorax*, rufous above, with a black suture separating the mesothorax and scutellum, parapsidal grooves entire, broad, moderately deep, well separated at the scutellum, and with numerous elevated lines crossing them; median groove distinct and extending well forward. The surface of the thorax is finely rugose, and, in a proper light, shows numerous punctures, each puncture bearing a short yellowish hair. Scutellum, coarsely wrinkled near the margin, and less coarsely wrinkled on the central portion, which is considerably elevated, transverse groove at base, colour rufous. Mesopleura, except spot just beneath the wings, rufous, sutures, metathorax and sternum black or blackish; entire pleura rugose. *Abdomen* rufous, with venter and posterior half of dorsum blackish, all abdominal segments covered with a microscopic network of impressed lines, most prominent on the terminal segments. *Wings* but little smoky, radial area not at all closed along the costal margin, areolet distinct and rather small. *Feet*, including the coxæ, entirely rufous, the claws only being black. Length, from 3½ to 4½ mm.

Digitized by Google

Described from twenty-one specimens bred from the galls.

Males—Three to three and one-half mm. in length, black, feet more reddish in colour than in the females, bases of the coxæ black, antennæ black throughout; otherwise like the females.

Described from forty-two bred specimens.

There is one male among those reared that has the rufous marking of the female on head, antennæ and thorax.

This species resembles very closely *Rhodites multispinosa*, Gill, but the galls are very different.

R. NEGLECTA, *n. sp.*

The gall is an abrupt, corky enlargement of a small stem, and contains numerous larval cells. The gall measures 15 mm. in breadth by 18 mm. in length, and is very smooth on the exterior.

Described from a single gall taken at Manitou, Colorado, May 8, 1892. The flies emerged on the 17th of the same month.

I have long known what I suppose to be the same gall in Michigan and Iowa, but never before succeeded in getting the gall-makers from them.

Gall-fly.—Female—*Head* black, except a little rufous upon the vertex and clypeus; face rather coarsely rugose, vertex and occiput finely rugose; antennæ entirely black and 14-jointed. *Thorax* entirely black, parapsidal grooves well defined and broadened anteriorly, median groove traceable but a short distance from the scutellum. Surface of the mesothorax shining, but under a low power of the microscope is seen to have a fine network of impressed lines and numerous shallow punctures over the entire surface; from each puncture arises a small yellowish hair. Scutellum black, slightly rufous on middle of disk, coarsely rugose about margin, less coarsely on the central raised portion. Pleuræ and mesothorax black and coarsely to finely rugose, most finely on the central portion of the mesopleuræ beneath the forewings. Abdomen black, except sides of second segment near the base, the seventh segment and the anterior portion of the venter. All the surface of the abdomen is covered with a network of microscopic impressed lines. *Wings* slightly smoky, radial area not at all closed along the costal margin. *Feet* rufous, except coxæ, which are blackish. Length, 2½ to 3 mm.

Described from two bred females.

Digitized by Google

Male—Except feet, entirely black; length, 2½ mm.; otherwise like females.

Described from one bred specimen.

R. FULGENS, *n. sp.*

Gall unknown.

Gall-flies.—All females, measuring from 2¾ to 4 mm. in length; general colour, rufous. *Head*, dark rufous, beneath the eyes and back of the eyes at the sides of the vertex washed with blackish; in small individuals the head is darker in colour, in some entirely black, with the exception of a narrow streak in the middle of the face; there is also, in every case but one, some rufous colouring upon the genæ. Lower face rather coarsely rugose, vertex and occiput finely rugose, ocelli and compound eyes whitish, in one case red, in no case black; antennæ 14-jointed, the first three joints rufous, the remainder black. *Thorax*, rufous quite dark in the small individuals, parapsidal and median grooves well defined, all extending to the collar; ridges outside the parapsidal grooves and between these and the median groove smooth and shining and sparsely punctured. Under a power of 60 diameters these smooth polished portions are seen to have the fine network of impressed lines which is so constant in this genus. Scutellum coarsely rugose towards the border, where it is blackish, more finely rufous on the raised central portion; no foveæ, but the usual transverse groove. Metathorax, a patch on mesopleura beneath the wings, and sternum black; in small specimens the whole mesopleura is black, except a shining rufous spot beneath the wings, entire pleuræ finely to coarsely rugose. *Abdomen* rufous, somewhat blackish on dorsum and venter, all the segments covered with the network of impressed lines, but they are too fine to be seen with a low power on the sides of the second segment. *Wings* slightly and evenly smoky, nervures slender, with no cloudiness surrounding them, brown in colour, the heaviest not being black, areolet medium, radical cell not at all closed along the costal margin. *Feet*, including coxæ, entirely rufous, in the smallest and darkest individuals the coxæ somewhat blackish at base.

Described from 17 flies sent me by Prof. J. M. Aldrich, from S. Dakota, and 11 flies bred in this laboratory. The galls in both cases have been lost or confused with others. The flies are at once separated from *R. multispinosa*, *R. arefactus*, and what I suppose to be Riley's *R. tuberculator*, which they much resemble, by the polished mesothorax and the greatly developed median groove.

Digitized by Google

WASHINGTON PHALANGIDA, WITH DESCRIPTION OF A NEW SOUTHERN LIOBUNUM.

BY NATHAN BANKS, SEA CLIFF, N. Y.

During the past few years Mr. Trevor Kincaid, of Olympia, Washington State, has kindly sent me many interesting arachnids from that region. Among them quite a number of phalangids, some of which have been described, others will be given in this paper. Previous to my descriptions of Californian and Washington phalangids of last year, but one species (*Liobunum exilipes*, Wood) was known from the Pacific region; I have described and recorded fifteen others. These, with the four new ones described below, make a total of twenty; probably as many more remain to be described. To an Eastern student this fauna is very interesting because of the number of peculiar forms not known in the Eastern States. The families and genera may be separated by the following table :—

1 { A compound claw to posterior tarsi, palpi very spiny. ..... (Phalangodidæ) *Sclerobunus.*
  { All tarsal claws simple. 2

2 { Last joint of palpus with a claw..... (Phalangidæ)..... 6
  { Last joint of palpus without a claw. 3

3 { Palpi very short, coxæ united..... (Trogulidæ) *Dendrolasma.*
  { Palpi long, coxæ separate..... (Nemastomidæ)..... 4

4 { Mandibles longer than body..... *Taracus.*
  { Mandibles shorter than body... 5

5 { Palpi slender..... *Nemastoma.*
  { The joints much swollen ..... *Phlegmacera.*

6 { Femur I. longer than body, palpal claw denticulate, lateral pore oblong ..... *Liobunum.*
  { Femur I. shorter than the body, palpal claw smooth, lateral pore nearly circular..... 7

7 { Eye-tubercle and anterior margin of cephalothorax spiny..... *Homolophus.*
  { Eye-tubercle and anterior margin smooth..... *Leptobunus.*

SCLEROBUNUS, Banks.

Both species of this genus occur in the State.

Colour red, tips of legs black..... *robustus.*

Colour brown, tips of legs yellowish..... *brunneus.*

Sclerobunus robustus, Pack.

Phalangodes robusta, Pack. The Cave Fauna of North America, 1888.

Digitized by Google

This species is quite common from Colorado north-westward to the Pacific.

Sclerobunus brunneus, Banks. Trans. Am. Ent. Soc. 1893.

This is not uncommon near Olympia.

TARACUS, Simon.

Taracus pallipes, n. sp.

Length of body, 6 mm.; mandibles, 9 mm.

Colour—Cephalothorax pale, with a broad, black, median stripe, as wide as the base of the mandibles; abdomen dark gray above with black spots; venter pale, darker near tip; legs pale, except tarsi, which are mostly black; mandibles black; palpi pale, except last joint, which is dark brown.

Cephalothorax smooth, with a prominent median spine behind the eye-tubercle, the latter with several small projections, each tipped with a hair; anterior margin of cephalothorax strongly bi-emarginate. The dorsum of the abdomen has many conical tubercles of various sizes; none, however, large; they are somewhat irregularly arranged in transverse rows; these tubercles are black, and have their base surrounded by a black ring. Femur II. is as long as the basal joint of the mandibles, which is equal to three-fourths of the body; the femur of the palpus is longer than the femur of leg I. and shorter than femur II.; the last joint of palpus is about one-fourth the length of the penultimate joint; the basal joints of the mandibles have many small elevations, each bearing a hair.

Locality—Washington State, one male and one female.

This species is larger, much less spiny, and darker coloured than *T. spinosus;* the mandibles slightly longer and the legs more slender than in that species. Some young specimens, one millimetre long, have the mandibles much shorter than in the adult, thus plainly showing that the genus has developed from forms with normal mandibles.

PHLEGMACERA, Packard.

Phlegmacera occidentalis, Banks. Psyche, Feb., 1894.

This species is quite frequent near Olympia.

NEMASTOMA, Koch.

Nemastoma modesta, Banks. Psyche, Feb., 1894.

This is common in California and Washington.

DENDROLASMA, Banks.

Dendrolasma mirabilis, Banks. Psyche, Jan., 1894.

Uncommon; I have but two specimens.

Digitized by Google

LIOBUNUM, Koch.

The three species known to me may be separated as follows, applying especially to the males:

Palpus with tibia, patella and tip of femur dark brown, dorsum mostly blackish ..... *exilipes.*

Palpus and dorsum paler.

Spinules on venter and coxæ, trochanters brown, a brown median stripe on dorsum..... *pacificum.*

Only stiff black hairs on coxæ and venter, trochanters pale, a large cruciate mark on the abdomen..... *parvulum.*

Liobunum pacificum, nov. sp.

Length, ♂ 4.2 mm.; femur I. 5.8 mm., tibia I. 4.5 mm., femur IV. 9 mm., tibia IV. 6.8 mm. Dorsum, dirty white to gray, with a broad median brown stripe above, which is nearly equal in width throughout, barely wider at middle of abdomen; two diverging white stripes run from the eye-tubercle to the anterior margin of the cephalothorax; a few brown spots on each side of cephalothorax; venter coxæ and palpi whitish; legs dirty white, trochanters brown, patellæ and tips of femora and tibiæ light brown, tarsi brownish; basal joint of mandibles with a brown line above. Eye-tubercle moderate, with a few blunt processes above. Palpus with spinules, largest on femur; none of the joints have their angles prolonged; tarsus nearly straight, as long as patella plus tibia, claw with a few small teeth near base. Dorsum of abdomen granulate. Coxæ, trochanters, sternum and ventral segments with spinules; a white spine on inner tip of coxæ I. and II.; legs with short stiff hairs, three or four false articulations in metatarsus I., none in tibia II.

♀ length, 7 mm., femur I. 6.2 mm. Similar to the ♂, but the brown stripe is usually broken up into small patches on the cephalothorax, and indistinct on the posterior half of the abdomen; the spinules on the palpi are smaller, and there are but three or four on each side of each ventral segment.

Sometimes the legs are brownish and the dorsum suffused with brown.

Numerous specimens, ♂ and ♀, from Olympia, Washington.

Liobunum exilipes, Wood.

Phalangium exilipes, Wood, Bull. Essex Institute, Vol. VI., p. 23. This was described from California and Nevada; I have a number of specimens which agree quite well with the description, but in most of them there is a broad yellow band near the middle of the abdomen,

Digitized by Google

behind which the dorsum is much spotted; in front it is black, with a few spots on each segment; the patellæ of the legs are dark brown; only in a few specimens are the white lines in front of the eye-tubercle bent to form a white margin; the palpus has the tibia, patella and tip of femur black only in the male.

Olympia, Washington, ♂ and ♀.

Liobunum parvulum, nov. sp.

Length, ♂ 4 mm.; femur I. 5 mm., tibia I. 4 mm, femur IV. 7 mm., tibia IV. 5.2 mm. Dorsum grayish, with a large spot on abdomen in the form of a Greek cross, mostly brownish, but paler within, the truncate tip reaching just beyond the middle of the abdomen; on the cephalothorax several dark brown patches, more or less connected; no distinct lines from the eye-tubercle to the anterior margin; palpi whitish, with a brown line above on patella and base of tibia; venter, coxæ and trochanters white; legs pale, with broad brown bands at tips of femora and tibiæ, less distinct ones on middles of these joints; patellæ brown, tarsi mostly blackish. Eye-tubercle very low and smooth. Coxæ, trochanters, venter, sternum, palpi and legs with short stiff black hairs, no spinules, a white spine on inner tips of coxæ I., II. and III. Several false articulations in metatarsus I., three or four in tibia II. Tibia of palpus straight, much longer than patella, tarsus slightly curved; about as long as tibia plus patella; claw with a few fine teeth near base, none of the angles of the joints prolonged.

♀ Length, 5 mm.; femur I. 4.2 mm. Similar to male; mandibles slightly brownish, margin of abdomen deeper gray, ventral segments with a few brown spots. The ovipositor is extruded; it is about half as long as body, cylindical and ringed, blackish in the middle.

Two males and one female, Olympia, Washington.

LEPTOBUNUS, Banks.

I have several specimens of a species belonging to this genus, but as they are all young, I will not describe them.

HOMOLOPHUS, Banks.

I would consider *Mitopus biceps*, Thorell, as a Homolophus, though the last joint of the palpus is longer than the two preceding; a better character for the genus is the presence of the two prominent supra-mandibular teeth. Mitopus, Thorell (of which *M. Morio*, Fab., was made the type), differs from Oligolophus in having no spines to the femur of palpus. *O. montanus*, Bks., would thus be a Mitopus. From Washington and

Digitized by Google

Idaho, I have another species of Homolophus, differing from *H. biceps* in the longer body, more spinose character, and in coloration.

Homolophus punctatus, nov. sp.

Length, ♂ 4 mm., breadth, 2 mm.; femur I. 2.6 mm., tibia I. 2 mm., femur IV. 4 mm., tibia IV. 3 mm. Dorsum pale brownish, with a great many small white spots and darker brown punctures; eye-tubercle with a broad white stripe above; a bifid white stripe from eye-tubercle to anterior margin; venter, sternum and coxæ whitish, stigmata and some spots on the venter, brown; trochanters white; legs brownish, darker on patellæ and ends of tibiæ; palpus with tibia, patella and most of femur black, tarsus paler; basal joint of mandibles brown above. Dorsum with many spinules, a pair of elevations on anterior margin of cephalothorax each bearing eight or ten small spines; two rows of small spines above on eye-tubercle; two prominent white supra-mandibular teeth; lateral pore nearly circular; no spinules on coxæ except on sides near tip; a white spine on inner tip of coxæ I and II; sternum and venter smooth; legs with femora, patellæ and tibiæ quite stout, and with spinules; a false articulation in metatarsus I, none in tibia II.; palpus short, basal joints very stout, with a few spinules and many short, stiff, black hairs; tarsus curved, not quite as long as tibia plus patella, with blunt spinules beneath; claw smooth.

♀ length, 5 mm., breadth, 2.4 mm Similar to male, but the median stripe is more distinct.

One ♂ Olympia, Washington; one ♀ Bear, Idaho [L. M. Cockerell].

Liobunum flavum, nov. sp.

Length, ♂ 5.5 mm., breadth, 4 mm.; femur I. 1.3 mm., tibia I. 8 mm., femur IV. 17 mm., tibia IV. 12 mm. Wholly yellow, an indistinct trace of a brown vase-mark on abdomen, patellæ of legs faintly brownish, tarsi whitish; cephalothorax with a few yellow-brown spots; eyes black. Dorsum hard, nearly coriaceous, covered with spinules; venter, sternum, coxæ, trochanters and femora with spinules, quite large on the coxæ; cephalothorax broad; eye-tubercle with a few spinuels; a row of plates on each side of each coxa; a spine on inner tips of coxæ I., II. and III.; several false articulations in metatarsus I. and two or three in tibia II.; palpus slender, with a few spinules, tibia but little longer than patella, tarsus curved, longer than tibia plus patella, claw with a few small teeth near base.

♀ Length, 8 mm., femur IV. 13 mm. Similar to ♂, but a little more browish, legs shorter and more reddish, fewer spinules on the venter, body softer.

One ♂, Shreveport, La.; one ♀, Harper's Ferry, W. Va.

The appearance of this species is somewhat like *L. verrucosum*, but the trochanters are pale and there is no golden tinge. It is more closely related to *L. ventricosum*, but has longer and lighter legs, with a more spinose body.

Digitized by Google

FLORIDA APHORURIDÆ.

[The following letter was communicated to me by Dr. Leonhard Stejneger, U. S. National Museum, through Mr. E. A. Schwarz. It is of particular interest, giving new localities for two species and adding one to our faunal list. ALEX. D. MACGILLIVRAY] :—

During my sojourn in Florida, 1892–93, I happened to collect some small insects, Collembola, of the family Lipuridæ. As I suppose very little, if anything, is known about the representatives of this group from that country, I presume every little contribution to the knowledge must be of a certain interest, and I thus take the liberty of writing you this letter. I have found three species, and my friend, Dr. H. Schott, who is a specialist in this matter, has assisted me in classifying them. The first species is the small white *Lipura* inermis*, Tullberg, easily recognized as entirely wanting anal spines ("*spinæ anales*"). It was known before this from Sweden, Finland, Sumatra and California, and probably from Germany and Italy. Thus it is widely distributed, but it must, anyhow, be very interesting to have it ascertained from a place so far distant from the other ones as Florida. In that State I found it twice. Both times it was walking about on top of the water at the border of a small lake not far from Clarhana, on the Orange Belt Railroad, in Orange county.

The second species is *Anurida Tullbergi*, Schott. It is a good deal larger and blackish with a faint blackish tint. Characteristics for this species are that the "*organa postantennalia*" show not less than 24–28 small rays or corpuscles (even called "tumors" and "elevations," but I do not find those terms expressive). Till this time, strange to say, it is only recorded from Sweden and Finland. I found it at the same place and living together with *Lipura inermis*.

The third species is *Anurida maritima*, Laboulbene, with only 7–8 shorter and thicker corpuscles in the *organa postantennalia* and three of the same kind in the tip of the antennæ, which Dr. Schott calls antennal organ. This species is already known from the Swedish West Coast, England, France and North America. I hardly think from Florida, though, till I found it on Key West. When walking along the shore, turning over stones in the water and looking for Blenniids and other fishes, I suddenly, under a piece of lime rock, not far from the hospital, found a great number of this little insect. It was high, or at least rising, tide, and they were

*I have changed this name to *Aphorura*, Lipura being preoccupied. See CAN. ENT. XXV., 1893, 313. A. D. M.

Digitized by Google

collected in a hole on the inferior side of the stone, about one foot below the surface of the water. When I turned the rock they floated on the surface of the sea. A good many of these specimens were young and not full grown.

Hoping these facts will be of some interest for you,

I have the honour to be,

Yours very respectfully,

DR. EINAR LÖNNBERG,
Docent Zoology R. University, Upsala, Sweden.

NOTES ON THE NEURATION AND RELATIONSHIPS OF PIERIDI AND ANTHOCHARIDI.

BY J. W. TUTT, F. E. S., LONDON, ENGLAND.
(Editor of the *Entomologist's Record*, Etc).

I little thought when I wrote my short note (*ante*, pp. 47-48) that the American species of *Anthocharidi* were in such a muddle as Mr. Dyar has quickly proved them to be. It will be very necessary to go much further now with the question, and I would suggest that those who have the opportunity should, during this season if possible, and next season if it be now too late, examine critically and make drawings of the eggs, larvæ and pupæ of the Anthocharids in question and publish them in the CANADIAN ENTOMOLOGIST, where they can be examined by British workers and compared with European species. Evidently, as the American species in question are widely distributed, it will want a number of willing hands.

It must be very evident to all scientific lepidopterists that however excellent a means of subdivision the neuration may present, yet it is only one character of a great many that have to be considered. The neuration I consider gives us a *prima facie* reason for certain groupings, and I have but little doubt that the other stages of the insects' life will in the main substantiate the primary groups thus obtained.

The American species of the genus *Pieris* seem to be very homogeneous and the genus fairly defined; it will have to be left to American specialists to determine the position of *Nathalis iole*. (The true members of *Pieris* have six subsegments in the larva).

The species *creusa*, *sara*, *julia*, *Morrisoni* and *stella* would appear to belong to *Euchloë*, *i. e.*, they have the neuration (*Ante*, p. 47. fig. 3.) of that genus.

Digitized by Google

The neuration of *Ausonides olympia*, *coloradensis*, *hyantis* and *creusa* is of a type differing from any British species, but falling intermediate between *Euchloë* (where 6-9* are on a stalk) and *Leucophasia* (where 6-11* are on a stalk), since Mr. Dyar describes them as having 6-10 on a stalk. It agrees, however, exactly with that of the European species *belia* which I note as follows:—"It differs from *Euchloë* in as much as that part of the cell normally between the bases of 6 and 8 (agreeing with my nomenclature, p. 47), is contracted to a point, and consequently 6 starts almost from base of 8; 10 also starts beyond the cell." It would appear, therefore, that this group of American Anthocharids will fall in generically with *belia*. The neuration of *belia* may be figured thus (Fig. 17):

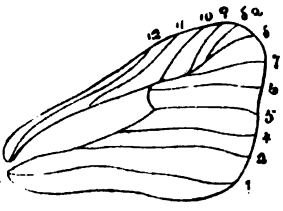


Fig. 17.
*Nomenclature following that used by Mr. Dyar.

It is evident that the primitive lepidopterous pupa was one which had a considerable amount of free movement. Dr. Chapman, whose excellent work on this subject should be read by all lepidopterists (*Vide Trans. Ent. Soc., Lon.*, 1893, *Ent. Record*, 1894, p. 25), has come to the conclusion that those pupæ which are the most solidified and have the fewest number of moveable segments are characteristic of the highest developed species, so far as the term "highest" refers to the greatest amount of differentiation which has been undergone from the primitive type. In this particular it will be seen that if we take the white butterflies or *Pierinæ* and consider the groups *Pieridi* and *Anthocharidi* the latter are much more specialised than the former, for, whilst most of the pupæ of the Pieridi have two moveable abdominal segments (5 & 6), when we examine *Euchloë cardamines* and *Leucophasia sinapis* we find the movement entirely gone and the pupa solid.

It is also worthy of note that this development of the pupa on which Dr. Chapman relies so strongly is accompanied in these two groups, so far as I have been able to learn, by an increased complexity of neuration, caused, if I may say so, by a gradual atrophy of the discoidal cell, and so gradual and continuous are the proofs of these developments that there seems no real reason for the separation of the two groups which appear to form a true and comprehensive whole.

The simplest form of neuration we get in our British species of white

Digitized by Google

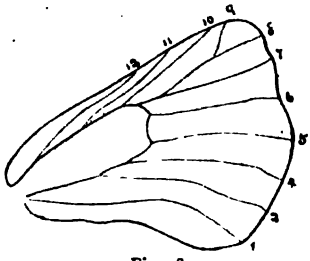


Fig. 18.

butterflies is that of *Aporia* which runs as shewn in Fig. 18.

Pieris is also a very simple type of neuration (vide *ante*, p. 47, Fig. 2) where 9 is absent and a nervure, which I prefer to call 8a, takes its place at apex.

The next step forward is to *Euchloë* (ante, p. 47, Fig. 3), where nervure 8a of *Pieris* and 9 of Aporia are both developed. This is followed by the neuration of *belia* (*vide* Fig. 17), above, where 6, 7, 8, 8a, 9 and 10 all come from one stalk, 11 only coming from the top of the cell. The highest point of development in this direction is reached in *Leucophasia*, Fig. 19.

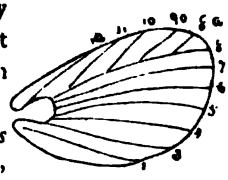


Fig. 19.

I have also examined the exotic species, *Delias eucharis*, which comes nearest to *Aporia* (Fig. 18), but lacks 10; and *Teracolus danæ*, which comes very near *Aporia*, 7 coming, however, from apex of cell with 8.

It is very evident that there is plenty to do in these groups before we can suppose we know anything about their real relationships, and that, even in the light of our present knowledge our generic arrangement is sadly at fault. I can only hope that these off-hand observations made on a few species, when working for other results, may lead to some arrangement that does not upset the primary structural characters we everywhere meet.

It may be here not out of place to say why I prefer my own system of numbering the nervures. A completely typical butterfly may be said to possess 13 nervures (on forewing) ending on the margin of the wing. Of these, all are rarely (probably never) present, but those that are must have their representatives in the typical butterfly. No. 1, which ends at anal angle, is always present. If, now, we look at a *Papilio*, we see 2, 3 and 4 coming from the base of the cell, 5 from its lower external point. Now, I maintain that this last nervure, which is really a continuation of the lower edge of the discoidal cell, should always be called by the same number; hence, if we call it 5 in *Papilio*, we should call it 5 in every other butterfly, since it is structurally identical in all. Now, if we simply number upwards, as is done by Mr. Dyar (p. 100), we should call this nervure 4 in *Pieris*, because only two come from bottom of cell (3 being

Digitized by Google

obsolete), thus destroying the analogy evidently existing between *Papilio* and *Pieris*. As, therefore, (so far as I know), no butterfly has more than 12 nervures, and these nervures are not always analogous when numbered straight on, and since it has been customary to call the costal nervure 12 and the two nervures usually arising from the top of the cell 10 and 11, I have found it necessary to give the supplementary cell at apex of wing another name, and I call it 8a. to prevent confusion. This is all I have to offer as an excuse to those gentlemen whose susceptibilities I may have offended by my vagary. I am very sorry, but at present I cannot even promise not to offend again.

"Rayleigh Villa," Westcombe Hill, S. E., April 13th, 1894.

NEW SPECIES OF NOTHOCHRYSA.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Since 1861, the date of Hagen's Synopsis, only three additional species of Chrysopidæ have been recorded from the United States—one from Florida, one from Texas and one from California. During the past summer I received a short note from Mr. A. P. Morse, of Wellesley, Mass., enclosing a few specimens of Chrysopidæ which he thought might prove new to our collection. When the specimens were studied they were found to belong to the genus *Nothochrysa* and probably new. Upon communicating this fact to him he requested me to describe the species and sent all his material, together with some other miscellaneous Chrysopidæ, among which was found another new species of *Nothochrysa*. The collection also contained specimens of *Chrysopa upsilon*, Fitch, and *Chrysopa chi*, Fitch; the latter was unknown to Dr. Hagen when he wrote his Synopsis, and is apparently rare.

The American species of *Nothochrysa* can be separated by means of the following table:—

A. Antennæ with the second segment annulated with black..... .....*annulata.*

A. A. Antennæ with the second segment not annulated with black.

B. Antennæ white, prothorax green, size large.....*phantasma.*

B. B. Antennæ and prothorax black, size small ..... *californica.*

Nothochrysa annulata, sp. nov.—Antennæ nearly or quite as long as the wings, basal segment white, immaculate, second segment ringed with black, remaining segments yellowish; head ferruginous, marked with black, as follows: Six dots on the vertex, one at each corner of an imagin-

Digitized by Google

ary square and one behind each eye, an O-shaped mark surrounding the base of the antennæ, broadest below, interrupted above; a spot between the antennæ, a crescent-shaped mark on the cheeks below the eyes, its anterior horn coalescing with the circle around the antennæ, and the apex of the palpi; the clypeus slighty emarginate; prothorax greenish-yellow, longer than broad, suddenly narrowed in front just before the middle, sides parallel behind the middle, a black dot at each corner and an indistinct transverse band at middle; wings hyaline, slightly annular at apex; pterostigma long, yellowish; the longitudinal veins and the veinlets yellowish white, except the following, which are black: the costal veinlets at base and apex, the radio-subcostal cross-vein near the base of the wing, the base of the veinlets between the first and second branches of radius, the base of the second branch of radius, both series of gradate veins, the base of the veinlets given off from the second branch of radius, the long cross-vein in the anal angle; in the posterior wings, the costal veinlets entirely and base of the veinlets between the first and second branches of radius; twenty-six costal veinlets before the pterostigma, fourteen or fifteen between the radius and its sector, nine in the inner gradate series, and ten in the outer gradate series; legs whitish, tarsi darker; abdomen green, hairy.

Length, 11 mm.; alar expanse, 30 mm.

Habitat—Wellesley, Mass, June.

Nothochrysa phantasma, sp. nov.—Antennæ longer than the wings, white, immaculate, basal segment strongly dilated within; head yellowish-white, immaculate; clypeus emarginate; palpi white; prothorax green, about as broad as long, narrowed in front, sides gradually widened backwards; meso-and metathorax yellowish-white, a purplish dot each side on the suture between the front and lateral lobes of the mesothorax, sometimes wanting; wings narrow, elongate, hyaline; hind wings angular at apex; pterostigna long, white, fuscous at base; the veins and veinlets green or white, except the following, which are black: the second branch of radius, the basal three or four veinlets between the first and second branches of radius, at their base, a spot surrounding the apical cross-vein between media and cubitus, and the gradate veins; in some immature specimens none of the veins are black; the veins and margin hairy; hairs short, white; twenty-six to twenty-nine costal veinlets before the pterostigma, sixteen to seventeen between the radius and its sector, eight to ten in the inner gradate series, seven to nine in the outer gradate series;

Digitized by Google

legs white, tarsi darker; abdomen green with a median dorsal yellow line; fifth dorsal segment with a large brownish spot.

Length, 13 mm.; alar expanse, 46 mm.

Habitat—West Chop, Massachusetts, July to August.

The following notes on the habits of this species are of interest:—"This beautiful little insect first attracted my attention while strolling at twilight along the silent leaf-strewn wood-roads of the Vineyard, in the immediate vicinity of West Chop. I first noticed it early in July, and it is still common in mid-August.

"It seems specially fond of oak trees and is nocturnal in habits, being rarely seen by day. When startled from its resting-place by daylight it flutters rapidly and erratically to a neighboring branch or downward to the sheltering undergrowth of huckleberry bushes, which everywhere fill the woods. Shortly after sundown, however, it awakens to activity, and may then be observed as a dimply perceptible paleness drifting silently and steadily through the twilight gloom.

"When taken in the hand, this impalpable apparition resolves itself into a ghostly little elf clad in pale-green and white, with brilliant purple eyes and gauzy wings; a veritable dryad of the woods."

Nothochrysa californica, Banks.—Antennæ shorter than the wings, wholly black; head reddish-yellow, antennal sockets surrounded with black, three black streaks above, connected with the black of antennal sockets, and a few blackish lines below antennæ; palpi black; prothorax black, with a median light stripe, broader at each end, and the extreme margin light, narrowed in front, sides gradually sloping; meso-and metathorax black; wings hyaline, round at apex; veins mostly black; costa and base of radius on fore-wing, costa and almost whole of radius on hind-wings, yellowish; pterostigma brown, throughout its entire length; sixteen or seventeen costal veinlets before the pterostigma, ten or eleven between the radius and its sector, ten in the inner gradate series, twelve in the outer gradate series; less testaceous, middle and hind femora darker, tips of tibiæ and joints of tarsi black; abdomen short, black, the posterior margin of the segments on sides narrowly yellowish.

Length, 9 mm.; alar expanse, 26 mm.

Habitat—California.

I am indebted to Mr. Nathan Banks, Sea Cliff, N. Y., for notes on this species.

Digitized by Google

REMARKS ON ZETHUS SLOSSONÆ.

BY WM. J. FOX, PHILADELPHIA, PA.

In the CANADIAN ENTOMOLOGIST for May (page 140) there appears an article by Mr. Wm. H. Patton, entitled "Zethus Aztecus in Florida," in which the author attempts to prove that *Zethus Poeyi*, *Slossonæ* and *aztecus* are the same species. As I am the authority for one of these species, it was but natural that I should make a study of the trio, in order to ascertain if Mr. Patton's assertions were correct. An examination of the material in my possession convinces me that Mr. P. is mistaken, and that his conclusions have no facts to enforce them. In my studies I have had a series of eight female and seven male specimens of *Slossonæ*, three females and one male of *Poeyi*, and a female of *aztecus*. In the first mentioned species, notwithstanding Mr. P.'s statements that the described differences are but variations, the only variations noticed in my series are that sometimes the yellow on clypeus and at apex of petiole are wanting. There is no yellow on the vertex of *Slossonæ*, while *Poeyi* (at least in the specimens before me) has always two large spots there; in general appearance *Slossonæ* is a much more robust insect than *Poeyi*, particularly the head and thorax, and the yellow markings thereon are by no means so promiscuous. Z. aztecus is quite a different insect in appearance from both the other species, and scarcely requires a comparison with them. Excluding the characters Patton regards as variations, the species differ as follows :—

POEYI.

Posterior face of metathorax smooth, velvety, not at all striated; enlargement of petiole rather finely punctured.

AZTECUS.

Abdomen black, greater part of legs black, petiole with exceedingly coarse punctures; collar above, anteriorly, with a prominent crest; second ventral, abdominal segment with large shallow punctures.

SLOSSONÆ.

Posterior face of metathorax very coarsely striated; enlargement of petiole tolerably coarsely punctured.

POEYI AND SLOSSONÆ.

Abdomen, except petiole, ferruginous, or claret brown; greater part of legs ferruginous * * * *; collar above, anteriorly, scarcely crested; second ventral segment with fine, sparse punctures.

Digitized by Google

ON OCHYRIA FERRUGATA, CL.

BY LOUIS B. PROUT, F. E. S, LONDON, N. E., ENGLAND.

I have recently been investigating the synonymy, and the natural history generally, of the two species of geometers which are frequently confused under the above name,* and as Packard was not quite clear about the matter, it seems desirable to call attention to the true position of their American representative. In Germany there has been frequent doubt whether *ferrugata*, Linn., and *spadicearia*, Bkh., were, or were not, specifically identical, and Zeller, to whom Packard owed his information concerning the European forms, came to the erroneous conclusion, though somewhat waveringly (see Stettin *Ent. Zeit.* xxxviii., p. 464), that they were forms of one and the same insect. He held that *ferrugata*, Cl., was really the *spadicearia* form, *ferrugata*, Linn. the *ferrugata* form (according to German usage), but, of course, did not touch the synonymy, believing that he dealt with but one species (Stettin *Ent. Zeit.*, xiv., 249). Now, when he sent examples to Packard, he naturally sent the form which is labelled as typical *ferrugata* in his collection (the darker, purple-banded form =*ferrugata* of Linn., H.-S., etc.). This, as Packard says, agrees entirely with the American species†, and it is this of which the black-banded form (var. *unidentaria* of Packard) is a variety (Stettin *Ent. Zeit.*, xlvi., 93).

But now, turning to England, we find that the specific distinctness of the two insects (now abundantly proved) has been less questioned, though, unfortunately, Haworth is responsible for considerable confusion of synonymy. Like Zeller, he accepted Clerck's figure (*Icones*, 6, 14) as the lighter red species (= *spadicearia*, Bkh.), but knew nothing of the name *spadicearia*, and introduced the species to British entomologists as *ferrugaria;* the other species, which is generally black-banded in England, though in America purple-banded forms seem common also, he named *unidentaria*.

In brief, *spadicearia*, Bkh. is =*ferrugaria*, Haw., Steph., Newman and perhaps =*ferrugata*, Cl., though his figure is very poor; *ferrugaria*, Linn., H.-S., Zeller, Packard, is =*unidentaria*, Haw., but its earliest name,

* Some of the results of my investigations may be seen in the *Entomologists' Record*, Vol. V., p. 111, etc., London, 1894.

† I have tested this by the material in our National Museum, and by some specimens kindly sent me by Mr. H. F. Wickham, of Iowa City.

Digitized by Google

assuming *ferrugata* to be preoccupied by the other species, is *corculata*, Hfn., *Berl. Mag.*, iv., 94.

So far as I have ascertained, *spadicearia*, Bkh., does not occur in the New World, and the following of Packard's citations must be deleted, as belonging thereto:—

Ferrugata, Cl. Ic. Ins., 6, 14, 1759 (perhaps).
Hübn., Schm. Eur., 460.
Stph., Nomencl., Br. Ins., 44, 1829.
Stph., Ill., iii., 216, 1831.
Stph., Cat. Br. Lep., 186, 1850.

Also, theoretically, the larval description from Newman's "British Moths," though practically the two larvæ are so similar that the description of one will apply to the other. Nevertheless, it will be well for American workers to bear in mind that our *ferrugata* is not identical with theirs.

PROFESSOR C. V. RILEY.

Every entomologist in North America will, we are confident, join with us in the expression of the deepest regret that Professor C. V. Riley has felt compelled, owing to the impaired state of his health, to resign his position as entomologist of the United States Department of Agriculture. The admirable work that Dr. Riley and his staff have accomplished, both in scientific and economic entomology during the many years that he was Director of the Division, is so well and widely known that it is unncessary to enter into any details here. There are few who possess in so eminent a degree as Dr. Riley scientific ability, accurate knowledge, painstaking industry and acute powers of observation; these gifts and attainments have been abundantly manifested in the immense additions that he has made to the knowledge of insect life in all its various phases, and it would be a calamity indeed if they were withdrawn from active exercise. It is gratifying, then, to learn that Dr. Riley will retain the honorary Curatorship of the Department of Insects in the U. S. National Museum, at Washington, and that he will now devote himself to some long-contemplated work of a purely scientific character. We earnestly trust that the relief from the cares and anxieties of administrative work in a Government Office will speedily restore his health and strength, and that we shall see the fruits of his labours during many a year to come.

While we deplore Dr. Riley's resignation, we cannot refrain from

Digitized by Google

expressing our gratification at the appointment of his successor. The authorities at Washington have shown their wisdom in conferring the vacant office upon Mr. L. O. Howard, who has been so long and so ably sharing in its duties as First Assistant. The Department is certainly to be congratulated upon having at hand a skilled and learned entomologist, who possesses in every respect the varied qualifications necessary for the successful performance of so important an office. We have every confidence that the world-wide reputation now possessed by the Division of Entomology at Washington, will be in nowise impaired under the administration of Mr. Howard, and we heartily wish him health, strength and long life for the successful performance of his arduous and important duties.

NOTES.

MR. C. H. TYLER TOWNSEND has resigned his position as Curator of the Museum at Kingston, Jamaica, and has returned to Las Cruces, New Mexico. He begs that his correspondents will take note of his change of address.

At the recent meeting of the Royal Society of Canada, held in Ottawa (May 22-26), MR. W. H. HARRINGTON, President of the Entomological Society of Ontario, and the REV. G. W. TAYLOR, a member of the Society, were unanimously elected Fellows. The meeting was highly successful, many of the papers read being able and valuable contributions to scientific knowledge. The Governor-General, Lord Aberdeen, was in constant attendance, and treated the members with great hospitality. The entomologists present were especially charmed to meet and welcome Mr. S. H. Scudder, who was one of the distinguished visitors from the United States.

THE POPULAR SCIENCE NEWS (Boston Mass.), has recently been much improved in form and matter, under the editorship of Dr. James R. Nichols. It is now filled with interesting articles, many of them illustrated, by eminent writers in different departments of science. The last two numbers contain articles by Prof. J. B. Smith, on the "Insect Parasites of Animals."

The first two parts of Mr. P. Wytsman's (79 Rue Neuve, Brussels, Belgium) reproduction of HUBNER'S EXOTIC BUTTERFLIES have been received. Each consists of ten coloured plates, without letterpress. They are very nicely executed on hand-made paper, and are evidently faithful copies both in drawing and colouring of the originals. The work will be completed in sixty parts, and will contain about 600 plates; the synonymy, nomenclature, etc., will be revised and brought down to date by Mr. W. F. Kirby, of the British Museum.

Digitized by Google

CORRESPONDENCE.

PAPILIO CRESPHONTES.

Sir,—About the 17th of August, a specimen of *Papilio cresphontes* was seen by Mr. Charles Currelley, on the southern shore of Sparrow Lake, about one hundred and ten miles north of Lake Ontario. It was a fine specimen and was flying aimlessly about over the water. I think that this is the most northerly appearance of this insect which has been recorded. CARLYLE ELLIS, Toronto.

BREPHOS INFANS MOESCHL, AT OTTAWA.

I have much pleasure in recording the capture of a nice specimen of this rare and beautiful moth, at Ottawa. It was taken by Lady Marjorie A. Hamilton-Gordon, who writes: "I caught it in a sunny glade of fir woods, behind Government House, on April 12th. It was among fir trees and stumps. I had seen one there two days before, flying high among the trees. I noticed my specimen crawling up a long stalk, with its wings closed; and then it flew away, more like a butterfly than a moth."

The Ottawa entomologists have been on the lookout for this insect for many years; but, until now, no one has succeeded in securing it. We hope that Lady Marjorie, who is an enthusiastic callector, will be equally fortunate with some of the other insects which ought to be found at Ottawa, but which have not yet been discovered here. J. FLETCHER.

CORRIGENDA.

Sir,—It is, perhaps, worth while to suggest corrections for several errors noticed in recent issues of Canadian Entomologist:—

In October number, 1892, on p. 265, lines 12 to 14 contain an inaccuracy. My observations indicated willow as a food-plant of the larva of *Colias nastes* (not *C. interior*). The record was correctly made by Mr. Fletcher in 1889 (Twentieth Annual Rept. Ent. Soc. Ont., page 7).

An error occurs in March number, 1893. On p. 87, line 20, Banff is mentioned as a Canadian habitat of *Chionobas Brucei*. The correct locality is Hector, B. C.

On p. 54, March number, 1892, Mr. W. H. Edwards mentions my having told him that Vaccinium was the food-plant of *Colias interior*. My statement requires correction. It referred to a local species, which at that time I considered as probably *Interior*, but which, with more complete material, has proved to be allied more closely to *Pelidne* and *Scudderi* than to *Interior*. THOMAS E. BEAN, Laggan, Alberta.

Mailed June 9th.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, JULY, 1894. No. 7.

A PRELIMINARY REVIEW OF THE NORTH AMERICAN DECTICIDÆ.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Having recently put my own collection of Decticidæ into systematic order and treated the collection of the U. S. National Museum entrusted to me by Dr. C. V. Riley in a similar manner, I have thought it would assist in obtaining better material for a future monograph if I were to publish at least a generic discrimination of the material at hand. At the same time I am able to clear up most of the synonymy of the species and assign to their proper location the various described species, very few of which (7 out of 23) will be found to have been originally placed in the genera to which they are here assigned. This is partly because it has been necessary to establish new generic categories for a large number of our species, which are very insufficiently known, having awaited a student ever since Herman's sketch of the genera of Decticidæ twenty years ago. In the course of another year I hope to make a complete study, and not only to characterize the genera more carefully, but to describe the numerous species here indicated. It is evident that in the West a considerable number of species are likely to occur additional to those now known to me, which number about fifty, divided among fifteen genera, five of which are monotypic, and only one of which is found also in the Old World. Much might be said regarding the geographical distribution of the genera, but I will reserve that for a future occasion.

TABLE FOR THE DETERMINATION OF THE GENERA OF N. A. DECTICIDÆ.

a 1. Prosternum armed with two erect spines.

b 1. Four terminal spines on the lower side of the hind femora, two smaller ones between a larger pair.

c 1. Ovipositor straight.

d 1. Prosternal spines short, obtuse..... *Engoniaspis.*

d 2. Prosternal spines long and slender, subacute ..... *Atlanticus.*

Digitized by Google

c 2. Ovipositor arcuate.

d 1. Ovipositor curved downward; a median carina on the prothorax..... *Drymadusa.*

d 2. Ovipositor curved upward; no median carina on prothorax..... *Orchesticus.*

b 2. Two terminal spines only (the outer) on lower side of hind femora..... *Tropizaspis.*

a 2. Prosternum unarmed.

b 1. Fore tibiæ spined above on both margins.

c 1. Large bulky insects; tegmina of ♂ almost completely concealed beneath the pronotum; eyes but little larger than antennal scrobes..... *Anabrus.*

c 2. Relatively small insects; exposed portion of ♂ tegmina half as large as pronotum; eyes fully twice as large as antennal scrobes..... *Cacopteris*, p. p.

b 2. Fore tibiæ spined above on outer margin only.

c 1. Fore tibiæ with several spines above on outer margin.

d 1. Fore tibiæ with three spines above on outer margin.

e 1. Legs short, the hind femora scarcely or not extending beyond abdomen; surface of pronotum granulate..... *Peranabrus.*

e 2. Legs long, the hind femora extending far beyond abdomen; surface of pronotum smooth.

f 1. Pronotum without distinct lateral carinæ, except sometimes posteriorly; a median carina rarely present and then weak.

g 1. Pronotum transversely arched as much on the posterior as on the anterior half.

h 1. Ovipositor straight..... *Cacopteris*, p. p.

h 2. Ovipositor arcuate..... *Eremopedes.*

g 2. Pronotum laterally subangulate posteriorly, and often with a slight median carinula..... *Idiostatus.*

Digitized by Google

f 2. Pronotum with distinct lateral and median carinæ, the latter sometimes weak.

g 1. Lateral carinæ of pronotum parallel or subparallel..... *Steiroxys.*

g 2. Lateral carinæ approximated in middle of anterior half of pronotum, so as to narrow the dorsum by nearly one-half..... *Idionotus.*

d 2. Fore tibiæ with four spines above on outer margin.

e 1. Descending lobes of pronotum declivent, the dorsum narrow..... *Clinopleura.*

e 2. Descending lobes of pronotum narrow, the dorsum broad..... *Plagiostira.*

c 2. Fore tibiæ with only one spine above on outer margin, situated at apex..... *Ateloplus.*

ENGONIASPIS, Brunner (Rév. Syst. Orth., 185).

No species of this genus has yet been described. Brunner founded it upon a species from Missouri, in his collection, which is very likely the same as that represented in the Riley collection of the U. S. National Museum by an imperfect specimen from an unknown locality.

ATLANTICUS (ἀτλαντικός) Gen. nov.

This generic name is proposed for the only species of Decticidæ (except some species of Orchesticus) that occur on the Atlantic slope of North America, and are confined to that district, or at least to the region east of the Mississippi. They resemble the European Thamnotrizon in general appearance, but have a spined prosternum. They are closely related to Engoniaspis, but the males are not apterous, the prosternal spines are well developed and the cerci are not depressed. Three species are known to me, two of them long ago described by Burmeister under the names of *Decticus dorsalis* and *D. pachymerus* (one of them, probably the latter, afterwards described by Walker as *Decticus derogatus*), and a third, which appears to be a more southern and robuster form, represented in my collection by two pairs coming from North Carolina to Florida. These species may be thus distinguished:—

Inner tooth of ♂ cerci short; lateral carinæ of pronotum sharply pronounced.

Digitized by Google

Hind femora less than twice as long as the pronotum; exposed portion of ♂ tegmina almost as ample as the pronotum.....*pachymerus.*

Hind femora more than twice as long as the pronotum; exposed portion of ♂ tegmina less than one-third as ample as the pronotum.....*dorsalis.*

Inner tooth of ♂ cerci long; lateral carinæ of pronotum not sharply pronounced.....*gibbosus.*

DRYMADUSA Stein (Berl. Ent. Zeitschr., IV., 257).

Recognized in an undescribed species in my collection, represented by a single ♀ from Oregon, in which the tegmina are very abbreviated and the ovipositor apically decurved. The genus has not before been known to occur in the New World, and appears to be the only genus of Decticidæ common to the two worlds. I have no European species with which to compare it, but from the description of the genus it seems to belong here, though the pronotum has a distinct median carina posteriorly.

ORCHESTICUS Saussure (Rev. Mag. Zool., 1859, 201).

This genus was founded upon a species from Tennessee, *O. americanus*, Sauss., unknown to me. The genus is, however, the richest in species of any of our Decticidæ, no less than six nominal species having been described, some of them (not yet carefully studied) possibly synonymous, and all, excepting the typical species, described under other generic names. These are, to give them in the order of their publication: *Anabrus haldemanii* Girard, *Anabrus minutus* and *A. stevensonii* Thomas, and *Thyreonotus cragini* and *T. scudderi* Bruner. All of these are from the Mississippi Valley and the mountain region on the west, which seem to be the home of the genus, though it occurs also sparingly on the Atlantic slope. In a preliminary arrangement of the species in the collections at hand I have separated about a dozen species.

TROPIZASPIS Brunner (Rév. Syst. Orth., 187).

To this genus belongs *Arytropteris steindachneri* Herm., from Puget Sound. The genus seems to be peculiar to the Pacific Coast, from whence half a dozen species are known to me, none but the above described, and this not heretofore referred to the present genus.

Digitized by Google

ANABRUS Haldeman (Stansb., Salt Lake, 372).

This genus was founded upon a species from Salt Lake, *A. simplex*, and the genus seems to be mainly confined to the elevated country west of the Mississippi prairies. Three other nominal species have been described, *A. purpurascens* Uhl., *A. similis* Scudd., and *A. coloradus* Thom., but whether these are all distinct or are all that exist in our collections, I have not yet endeavoured to determine. All the above, however, certainly belong to Anabrus, but three others, originally described as Anabri, belong, as noted above, to Orchesticus.

PERANABRUS, Gen. nov.

This generic name is proposed for *Thamnotrizon scabricollis* Thom., from Southern Montana, which, except for its scabrous pronotum, has much the aspect of an Anabrus. It differs from it, however, in lacking spines upon the inner margin of the fore-tibiæ above, and in its distinctly carinate pronotum. It is poorly figured by Glover in his Ill. N. A. Ent., Orth., pl. 13, fig. 6.

CACOPTERIS (κακός, πτερόν), Gen. nov.

This genus, containing half a dozen species of minor size, none of which have been described, is remarkable for the fact that the inner margin of the upper surface of the fore-tibiæ is sometimes spined and sometimes unarmed; generally individuals of the same species seem to be always either one or the other, but in at least two of them, individuals of the same species differ in this respect, the males being more frequently spined than the females; when armed, there are always three spines present. The genus is peculiar to California and Western Nevada and the southern margin of the United States as far east as the upper Rio Grande. It has somewhat the aspect of the European Antaxius.

EREMOPEDES (ἐρῆμος, πηδάω), Gen. nov.

Founded on an Arizona species, of which a single ♀ is in the U. S. National Museum. It has a very uniformly rounded, slightly compressed body, with a general resemblance to the smaller forms of Orchesticus.

IDIOSTATUS Pictet (Mém. Soc. Phys. Gen., XXX., vi. 63).

Two species of this genus have been described; a smaller, *I. hermanni* (*Steiroxys hermanni* Thos.=*Idiostatus californicus* Pict.), and a larger, *I. bilineata* (*Steiroxys bilineata* Thom.), and there is what is apparently a third species, with excessively long ovipositor, in the U. S. National Museum. All the species come from California and Oregon.

Digitized by Google

STEIROXYS Hermann (Verh. Zool.-bot. Ges. Wien, XXIV. 207).

We possess three species of this genus, two of which have been described: *S. trilineatus* (*Thamnotrizon trilineatus* Thom.), the type of the genus from Wyoming and Utah, and *S. pallidipalpus* (*Decticus pallidipalpus* Thom.), from Utah, Idaho and Nevada; and apparently a third species from Northern California, Oregon and Alberta, which may be called *S. borealis*. They may be distinguished as follows:—

Abdomen conspicuously ornamented with a median series of V-shaped black spots.....*trilineatus.*

Abdomen with no conspicuous median abdominal markings.

Hind femora very long, more than three and a-half times longer than the pronotum; dorsal field of pronotum much less than twice as long as greatest breadth.....*borealis.*

Hind femora not so long, being scarcely more than three times as long as the pronotum; dorsal field of pronotum almost twice as long as greatest breadth.....*pallidipalpus.*

IDIONOTUS (ἴδιος, νῶτος), Gen. nov.

This genus is established on a couple of undescribed species, one in the U. S. National Museum, from California, the other in my own collection, collected by Kennicott somewhere on his explorations in or going to Alaska. It closely resembles Steiroxys.

CLINOPLEURA (κλίνω, πλευρά), Gen. nov.

This name is proposed for *Steiroxys melanopleura* Scudd., and its allies. It is nearly related to the European Psorodonotus, but is abundantly distinct, with no such prolonged pronotum. The typical species comes from Southern California and Utah, and two other Californian species are in the U. S. National Museum.

PLAGIOSTIRA Scudder (Wheeler's Ann. Rep., 1876, 501).

Founded upon *P. albonotata* Scudd., from Northern New Mexico. I have what is apparently a second and larger species of uniform colouring, but in poor condition, taken on the surveys for the Northern Pacific R. R.

ATELOPLUS (ἀτελής, ὅπλον), Gen. nov.

A peculiar form, apparently nearly allied to Idiostatus and Cacopteris and closely resembling them in general appearance, but remarkable for having both margins of the upper surface of the fore-tibiæ entirely devoid of spines, except a single one at the apex on the outer side. I know of but one species, from San Diego, California, represented by a single ♀ in the U. S. National Museum.

Digitized by Google

The following alphabetical list shows the genera to which the described species are here referred, with initial bibliographical references:—

Anabrus coloradus Thom., Rep. Hayd. Surv., V., 440 (*Anabrus.*)
" haldemanii Gir., Marcy Expl. Red Riv., 259 [248], pl. 15, figs. 5–8 (*Orchesticus*).
" minutus Thom., Proc. Philad. Acad., 1870, 1875 (*Orchesticus*).
" purpurascens Uhl., Proc. Ent. Soc. Philad., II., 550 (*Anabrus*).
" similis Scudd., Hayd. Rep. Nebr., 249 (*Anabrus*).
" simplex Hald., Stansb., Expl. Utah, 372, pl. 10, fig. 4 (*Anabrus*).
" stevensonii Thom., Proc. Philad. Acad., 1870, 1875 (*Orchesticus*).

Arytropteris steindachneri Herm., Verh. Zool.-bot. Ges. Wien, XXIV., 204–205, figs. 98–102 (*Tropizaspis*).

Decticus derogatus Walk., Cat. Derm. Salt. Brit. Mus., II., 260 (*Atlanticus pachymerus*).
" dorsalis Burm., Handb. Entom., II., 713 (*Atlanticus*).
" pachymerus Burm., Handb. Entom., II., 712 (*Atlanticus*).
" pallidipalpus Thom., Fin. Rep. Hayd. Surv., V., 442 (*Steiroxys*).
" sphagnorum Walk., Cat. Derm. Salt. Brit. Mus., II., 258–259 (Not a Decticid).

Idiostatus californicus Pict., Mem. Soc. Phys. Gen., XXX., vi., 64–65, figs. 35, 35a (*Idiostatus hermanni*).

Orchesticus americanus Sauss., Rev. Mag. Zool., 1859, 201 (*Orchesticus*).

Plagiostira albonotata Scudd., Ann. Rep. Wheel. Surv., 1876, 501 (*Plagiostira*).

Steiroxys bilineata Thom., Fin. Rep. Wheel. Surv., V., 905 (*Idiostatus*).
" hermanni Thom., Fin. Rep. Wheel. Surv., V., 904, pl. 44, fig. 4 (*Idiostatus*).
" melanopleura Scudd., Ann. Rep. Wheel. Surv., 1876, 500 (*Clinopleura*).

Thamnotrizon scabricollis Thom., Fin. Rep. Hayd. Surv., V., 441 (*Peranabrus*).
" trilineatus Thom., Proc. Philad. Acad., 1870, 1876 (*Steiroxys*).

Thyreonotus cragini Brun., Bull. Washb. Lab., I., 129 (*Orchesticus*).
" scudderi Brun., Bull. Washb. Lab., I., 129–130 (*Orchesticus*).

All known North American Decticidæ are apterous or subapterous, their tegmina never extending over more than two abdominal segments or thereabouts. But many European species are fully winged, and such

Digitized by Google

forms should be looked for in America, especially in the West. To the beginner it should be added that by no means all apterous or subapterous Locustarians are Decticidæ, as witness the ubiquitous Centhophili; but Decticidæ may be distinguished from other Locustarians (to follow Brunner's latest table for their separation) by having the tarsi more or less depressed (the Stenopelmatidæ have them distinctly compressed); by the presence of foramina near the base of the anterior tibiæ (wanting in Gryllacrididæ); by having the antennæ inserted between the eyes, nearer the summit of the occiput than the upper margin of the labrum (instead of the opposite); by having the first two tarsal joints longitudinally sulcate on the sides; by having the fore-tibial foramina slit-like rather than elliptical; by the presence of an apical spine on the outer side of the fore-tibiæ above (wanting, however, in a single African genus of Decticidæ); and by the presence of a free plantula at the base of the first hind tarsal joint beneath, this last character separating them from the Locustidæ proper, where the plantula is not free.

BOTYS URTICALOIDES, N. S.

BY THE REV. THOMAS W. FYLES, SOUTH QUEBEC.

Expanse of wings one and one-fourth inches. Length of body six-tenths of an inch. Head and antennæ black. Thorax, above black bordered with white, beneath white. Legs white. Wings white, satiny, translucent. Primaries have a slight tinge of yellow. On the costa, near the middle, are two black or dark brown blotches; below these, towards the inner margin, are two other blotches, sometimes united—the whole forming a broken, transverse band. Beyond this, near the hind margin and extending from near the inner angle for about two-thirds of the width of the wing, is a second, narrower band. Secondaries have a roseate tinge. Abdomen above black, the segments bordered with white, and the extremity tipped with white; beneath white.

Described from four specimens, taken all at one time and flying by day, in an "intervale" of Brome County, Province of Quebec.

Only one other specimen of this insect has, as far as I can learn, been taken. It was discovered by Mr. Ashmead and Mr. Linell amongst unnamed material in the National Museum at Washington, D. C.

Digitized by Google

DESCRIPTIONS OF THE LARVÆ OF CERTAIN TENTHREDINIDÆ.

BY HARRISON G. DYAR, NEW YORK.

Blennocampa bipartita, Cresson.

A single fly, bred from a larva on oak at Boston, Mass., appears to belong to this species. The fly differs from Mr. Cresson's description in that all the tarsi are blackish; the abdomen above is largely blackish; there is no luteous tint discernible on the lateral margin of middle lobe of mesothorax; the anterior and posterior margins of the luteous stigma are blackish and the veins are nearly black. There are two black points in the upper medial cell and one in the second submarginal cell on forewings. The larva seems to closely resemble that described in the 5th report U. S. Entom. Commission, p. 206, as *Monophadnus dilutus*, Cresson, but the fly belongs to a different genus.

Larva.—Sitting flat on the young leaves of the black oak and eating holes through; solitary. Head wider than high, rounded above; smooth green; eyes black, with a blackish stripe from each to vertex, and two contiguous black spots on upper part of clypeus; width, 1.4 mm. Abdominal feet present on joints 6-11 and 13 (20 feet). Body smooth, not annulate, the subventral region folded. Colour uniform green. Two transverse rows on each segment of Y-shaped furcate processes, in a longitudinal plane, arranged as follows: Addorsal, two; subdorsal, two; substigmatal, one; subventral, two, not in line, one below the other. The anterior and posterior processes are tipped with black. Length, 12 mm.

Final stage.—The larva moulted and entered the ground. Smooth, annulated, with slightly elevated, concolorous warts instead of processes, inconspicuous. Pale greenish, concolorous; head pale testaceous; width, 1.4 mm.

The larva formed an elliptical cell in the ground, lined with a black secretion, about the first of June. The fly emerged the following April.

Emphytus canadensis, Kirby.

(The pansy saw-fly.)

7 ♀ ♀. The flies differ slightly from Provancher's description in having the fore and middle tarsi dusky toward tips, while the veins and stigma are black, rather than dark brown.

Larva.—Eating the whole leaf, curled spirally on the back; falls off when disturbed. Head rounded, normal, dull black, slightly slaty; eye

Digitized by Google

and mouth black, the sutures around clypeus pale; some short, pale hairs; width, 1.4 mm. Body of nearly equal width, slightly largest at anterior end; thoracic feet small, abdominal ones well developed, present on joints 6 to 13 (22 feet). Segments 6-annulate, rather sharply so; and about as distinct as the segmental incisures. Colour slaty black dorsally, not shining, smooth, the dorsal vessel showing darker; below the spiracles olive gray. Thoracic feet pale. On each segment, on 2nd annulet, a transverse row of minute white points, with a second one on 1st annulet stigmatally; a few less conspicuous ones on subventral ridge.

Final stage.—Head blackish above, pale below; eye in a black spot; mouth brown; antennæ and palpi pointed, minutely brown ringed; width, 1.4 mm. Body entirely dark olive-gray, rather bluish, slaty, the segments neatly 6-annulate, not shining, evenly minutely granular. Feet transparent, spiracles in paler areas. No white points or tubercles.

The larvæ do not feed in this stage, but seek for decayed or soft wood in which they bore a gallery to serve as a place for pupation.

Larvæ abundant on cultivated pansies at Plattsburg, N. Y., in September, the flies emerging the following April.

Emphytus cinctipes, Norton.

(The rare rose saw-fly.)

Eating the whole leaf and resting on the back, curled spirally, with the anal end on top. Head well rounded, flat over clypeus, pale brown, the ocellus in a round black spot; mouth blackish, not shining; a blackish longitudinal stripe on vertex of head. Width, 1.5 mm. Abdominal feet present on joints 6-12 and 13 (22 feet); thoracic feet large, visible from the dorsal aspect, spreading, but not greatly so. Rather dark green dorsally and in spots along the bases of the legs; whitish subtranslucent subventrally and ventrally and on the feet. Minute pointed, conical, white dots arranged in three transverse rows on each segment on the first, second and fourth annulets; on the first annulet, two each side subdorsally; on the second and fourth annulets, two subdorsally and two laterally and others substigmatally; but these last are very inconspicuous on the pale ground colour. Tracheæ showing by transparency as a white cord. The green colour becomes darker posteriorly and is interrupted at joint 12, showing that it is partly due to the food in the alimentary canal.

Final stage.—Head shining, slightly punctured, pale straw-yellow, with large black eye spot; width, 1.5 mm. Body smooth, 6-annulate, without any tubercles, coloured as before, but paler. Dorsal colour bluish-

Digitized by Google

green, especially on joint 2. A little later the black shade reappears on the vertex of head, and the dorsal colour of the body becomes dark green. The larvæ do not feed in this stage, but enter the ground and form a cell lined imperfectly and with fragile walls.

Larvæ on cultivated rose bushes at Boston, Mass., in June, the flies emerging in July.

Nematus monochroma, Norton.

6 ♂♂, 4 ♀♀. The ♀ differs from Norton's description only in having the antennæ black, including the two basal joints, and the tarsi dusky. It differs from the descriptions of *N. ocreatus*, Harrington, and of *N. mellinus*, Cresson, in having no black marks on the thorax or abdomen. The metathorax and basal plates are marked with dark brown. The ♂ is like the ♀ below, but above it is largely black. A black patch covers the whole top of the head behind the antennæ, except a narrow border to the eyes. Thorax above shining black; tegulæ and posterior angles of prothorax pale. Abdomen black above, except at the extreme tip. In other specimens the black is more extensive, staining the sides below the insertion of the wings and the whole tip of abdomen.

Larva.—Gregarious, holding to the edge of a leaf by the thoracic feet. Head smooth, shining black, a little paler around the mouth or else entirely pale testaceous, with the eye black; width, 1.3 mm. Body green, slightly shining, annulate; abdominal feet present on joints 6-11 and 13 (20 feet), but very small on joint 13. Two transverse rows per segment of elevated black spots, minute on the back, confused laterally and larger, especially two subventral ones. Spots obsolete posteriorly. Colour leaf-green, darker along the back, joint 12 tinged with yellowish. Thoracic feet greenish or tinged with black at base.

Final stage.—Differs in lacking the black spots. The larvæ enter the ground and form neat, dark brown, elliptical cocoons; that of the ♀ larger than that of the ♂.

Larvæ on poplar at Boston, Mass., in June. The flies emerged the following April.

Nematus salicis-odoratus, n. sp.

(The scented willow saw-fly.)

1 ♂, 4 ♀♀. ♀ Length, 5.5 mm. Antennæ 4 mm. long, black, third joint a little shorter than fourth. Head pale testaceous, tips of mandibles blackish brown; a large black spot covering ocelli and reaching nearly to base of antennæ, continued backward more narrowly to the

Digitized by Google

occiput. Body pale testaceous, with a faint brownish shade; thorax above, except the posterior angles and tegulæ, black, the sutures marked by pale lines; abdomen with a broad black stripe above, not reaching quite to the sides nor to the tip; end of ovipositor sheaths black. Legs concolorous with body, the tips of posterior tibiæ and their tarsi blackish; tarsi of two anterior pair of legs slightly dusky at the tips of the joints. Wings hyaline, nervures black, stigma dull luteous or partly blackish. A black point in the outer half of second submarginal cell.

♂ Length, 4 mm. The black patch on the head has a slight lateral projection, nearly touching the border of the eye; there is a black line on the pleura just below the wings and the venter is shaded with blackish brown on prothorax and mesothorax. Otherwise as in the ♀.

Belongs to the group represented by the species *sumptus*, *pleuricus*, *ribesii*, *lateralis*, *desmodioides*, *fulvipes*, *agilis*, *pallifrons*, *nevadensis* and *trifurcatus*, but does not seem to be identical with any of them.

Eggs.—Laid in masses on the under side of a leaf, on the surface without any saw-cuts. The dried, empty skins measure .8 x .4 mm.

First larval stage.—Head .3 mm. wide, rounded, shining black as in the next stage.

Second stage.—Larvæ eating holes in the leaf, near the eggs. Head rounded, full at vertex, black; width, .5 mm. Body held S-shaped; thoracic feet blackish. Segments annulate shining greenish yellow, pale; the two rows of subventral tubercles visible, smoky; none seen dorsally. Anal plate small, black.

Third stage.—Head as before; width, .7 mm.; anal plate and spines black. Lateral and subventral tubercles blackish; subdorsal black spots faintly indicated. Body light green; joints 2, 12 and 13 posteriorly yellowish. Upon approaching a group of these larvæ upon a tree, their peculiar odour is very obvious.

Fourth stage.—As in the next stage, except that the black markings are smaller. Width of head, 1.0 mm.

Fifth stage.—Head well rounded; clypeus large, quadrate, smooth, shining black, the sutures and antennæ honey-yellow; width, 1.4 mm. Body normal for Nematus, terminal segments somewhat swollen. Thoracic feet large, abdominal ones present on joints 6-11 and 13 (20 feet), the last pair small. Five medioventral eversible pale yellow scent glands behind the feet on joints 6-10. These function in the normal position of defense of the larvæ when the abdomen is held up in an S-shape. A

Digitized by Google

black anal plate with pair of terminal spines. Segments 4-5 annulate, smooth, slightly shining, the tubercles obsolete dorsally, but represented laterally and subventrally by large, smooth, rounded, shining black prominences, largest subventrally. A dorsal and subdorsal row of round black spots with irregular edges, four on each segment in a straight, even line, not shining like the subventral tubercles. Body light green; joints 2, 12 and 13 posteriorly orange. Venter orange-tinted. Thoracic feet black, except at the joints; abdominal ones green.

Larvæ entered the earth without moulting and formed thin, elliptical black cocoons of uniform close texture. Size, 6 to 7 x 2.5 to 4 mm.

Larvæ at Wood's Holl, Mass., in July and August.

FURTHER NOTES ON SCALE INSECTS (COCCIDÆ).

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEX.

The numbering of these notes is continued from p. 132.

(9.) *Chionaspis ortholobis*, Comst. In the middle of March Prof. Bruner sent me a *Chionaspis*, which he said was common on cottonwood in Nebraska, being also occasionally found on the white willow. It appeared to me to be a new species, and I was about to name it after its discoverer, but Mr. L. O. Howard, to whom I had sent specimens, delared it was *ortholobis*. This I could hardly believe, as both ♂ and ♀ scales disagreed with Comstock's description of *C. ortholobis*, so I wrote disputing the point, and enclosing further specimens. In due time came a letter stating that both Mr. Howard and Mr. Pergande had taken great trouble to examine numerous specimens and compare them with Comstock's types, and that the identity was practically certain.

The fact, therefore, appears that the original description was inadequate and somewhat inaccurate or misleading, so to save others from the mistake I came so near making, I append details of the Nebraska specimens.

♀ Scale snow-white, broadly mytiliform, slightly convex, straight or somewhat curved, tapering anteriorly; exuviæ yellowish-white, inconspicuous. Removed from the bark, the scale leaves a white mark, the so-called ventral scale. (Compared with English *C. salicis* received from Mr. Newstead, our species is quite different; the scales of *salicis* are smaller and broader, and not so white, and they have conspicuous orange or orange-brown exuviæ. *C. salicis* from Rouen, France, received from Mr. Morgan, is the same as the English form.)

Digitized by Google

♀ as described by Comstock. The lobes retain their brown colour after the rest of the ♀ has become colourless from soda treatment and compression. Rows of gland-orifices indicate obsolete segmentation of terminal portion. Ventral glands in five groups, each of about 22. Mouth-parts very near anterior border.

Eggs dark purple, found with ♀ in March. The ♀, however, is dark brown, not dark purple.

♂ Scale distinctly unicarinate. Comstock laid great stress on the keel-less ♂ scale of *ortholobis*, but my specimens show that it has normally a distinct keel. As Mr. Howard remarks, one can find individuals not showing any keel, and it so happened that Comstock's types were of this kind.

Although my supposed new species was thus set aside, Mr. Howard tells me that he knows of an undescribed *Chionaspis* on Cottonwood.

(10.) *Mytilaspis albus* var. *concolor*, Ckll., common on *Atriplex canescens* at Las Cruces, N. M. On March 19, the males, hitherto undescribed, were hatching.

♂ with the body dark purple, legs very pale yellowish, wings white. Thorax long, wings set far back. Caudal style long. Last joint of antenna shorter than those before it. Tarsus with long knobbed hairs, claw with small knobbed digitules.

(11.) *Aspidiotus abietis* (Schrank), Löw, 1882.

n. syn. *A. abietis*, Comstock.

n. syn. *A. pini*, Comstock, fide Pergande.

Lately Mr. K Sulc wrote me that the *Coccus abietis* of Schrank was now known to be an *Aspidiotus*; therefore, he remarked, Comstock's *A. abietis* could not be retained, at all events under that name. He was not able to say whether *abietis*, Comst., was the same as Schrank's insect, but in order that I might determine this point, he was so good as to send me examples of *abietis*, Schr., which had been found on *Pinus silvestris* at Chuchle, near Prague, Bohemia.

It happened that I possessed examples of *A. abietis*, Comst., sent from Ithaca, N. Y., by Mr. R. H. Pettit; found on *Abies canadensis*. On comparing these with those from Europe, I was certain that I had only one species before me. Among the Bohemian examples, I found a ♂; it was bright yellow, with a dark brown thoracic band

Digitized by Google

Being much interested in this discovery, I hastened to communicate it to Messrs. Riley and Howard, at Washington, at the same time sending some of the Bohemian material. A reply came, that Mr. Pergande had examined my specimens and also Comstock's types, the result being that my opinion as to the identity was fully confirmed, and *A. pini*, Comst., was also added to the synonymy! Mr. Pergande's report was enclosed, and it is so interesting that I will take the liberty of reproducing it here:—

"Examined *A. abietis*, Schr., from Bohemia, and compared it with specimens of Comstock's types of *abietis*, and found that both are absolutely alike. Comstock's description of *abietis* agrees with the characters of the immature female, in which there are no groups of spinnerets; while in the mature female there are plainly five groups of spinnerets, exactly as in the European form.

"Among the specimens of Comstock's types of *A. abietis* I came across one specimen, unlike the rest, with but the two anterior groups of spinnerets present; and found it, after comparing it with the description of his *Asp. pini*, to agree with that species in every particular.

"I prepared specimens of his typical *Asp. pini* and compared them also with Comstock's and the European *A. abietis*, and found that all three of them agree perfectly in every respect.

"Those described by Comstock under the name of *A. pini*, are nothing else than a younger stage of *abietis*."

(12.) *Aspidiotus ancylus*, Putnam. Prof. L. Bruner lately sent me examples of an *Aspidiotus*, which occurs commonly in the City of Lincoln, Nebraska, only on the soft maple. These I found to agree with *A. ancylus*, except for the fact that I could by no means see the grouped glands of that species. Therefore, using Comstock's synopsis (Cornell Report, 1883, p. 56), they would have to be referred to *perniciosus*;—although they were not quite like any *perniciosus* I had ever seen, and the circumstances under which they were found were against such a reference.

I then sent specimens to the Dept. Agriculture, remarking on this anomaly, but stating that I believed they must certainly be some form of *ancylus*. Mr. Pergande again gave assistance, and found that the lack of grouped glands, as in *A. abietis*, was simply a sign of immaturity; this he practically demonstrated by discovering among the material I sent some mature females, which presented the five groups of glands, exactly as in typical *ancylus*.

Digitized by Google

ON CHIONOBAS ALBERTA, ELWES.

BY W. H. EDWARDS, COALBURGH, WEST VA.

Mr. Wolley Dod has recently sent me from Calgary quite a number of specimens of this form, and I consider it a valid species. The description, however, of *Alberta* (♂) is quite inadequate. There is great variation in expanse of wing, and in colour. Some examples are dark brown, some are yellow-white, like the pale *N. Ridingsii;* some are decidedly fulvous, like *Varuna*. Of 13 ♂ ♂, all have one ocellus on fore-wing, and four have two; none have three. Five have one small blind ocellus on hind wings; the rest none at all. In a few the wings are thin, but not so as to permit the ink on the labels to show through, while the larger number are as opaque as in *Varuna;* in the thinner ones the mesial band shows above, defined on both edges; in the others it shows obscurely, and often the inner edge of the band is lost in the dark hue of the base. On the under side the general form of the mesial band of hind wings is circular exteriorly, and in most cases the band is broad; but in other cases it is narrow; the exterior edge is sometimes pretty even, a little erose; in others distinctly crenated, the crenations not prominent; in other cases there is a rounded prominence opposite the cell, closely like *Varuna*. In the larger part of the examples the circular or angular outline is broken near costal margin by a slight sinus. On the inner side the band has a rounded or angular sinus, the deepest part of which falls on median. The largest female expands 1.6 inch., and there is the same sort of variation in colour as in the males. One has no ocellus on fore-wing; one has one; three have two, and four have three; two have no ocellus on hind wing, and all the rest (7) have one each. In both sexes the fore-wing beneath presents a more or less complete band running with the band of hind wings. There is nothing of this in *Varuna*. Mr. Dod sent a large number of eggs, which he obtained by confining the females over grass, though, he says, they laid on everything except the grass.

He also sent me twenty-five true *Varuna*, ♂ ♀. The *Alberta* are labelled as taken from May 12th to May 23rd; the *Varuna* from May 20th to May 29th.

P. S.—I am able to add that Mrs. Peart reports that the eggs of *Alberta* are ribbed like *Brucei*, and not at all like *Uhleri*, which differs from all the Chionobas eggs we have seen. Probably *Varuna* will be found to have ribs of the same type as *Uhleri*.

Digitized by Google

CANADIAN HYMENOPTERA—No. 4.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

My last paper dealt chiefly with Ottawa sawflies, and in the present article I venture to describe a few Western species which have been for some time in my collection, and which seen to be unnamed. Synoptic tables are added as an aid to collectors of these insects.

MONOPHADNUS ATRATUS, *n. sp.*

Male—Length, 6 mm.; black, polished; head wider than thorax, eyes prominent; antennæ short and stout, third joint nearly twice as long as fourth, four to nine sub-equal. Apex of femora and remainder of legs pale. Wings slightly infumated, marginal cross-nervure straight, received in third submarginal cell beyond the middle, second recurrent nervure received about one-fourth from base of same cell, an opaque dot in second.

Described from one specimen received from the Rev. G. W. Taylor, Victoria, Vancouver Island. Allied to *M. nigrellus*, Cress., but in that species the third and fourth joints of antennæ are about equal in length, and the marginal cross-nervure coincides with the apical nervure of third submarginal cell.

The following table may aid in separating some of the species of this genus, but the descriptions of many of the black forms do not give any characters sufficiently distinctive to make the determination of specimens satisfactory. Probably a critical comparison of the types would reduce the number.

MONOPHADNUS, Hartig.

1	(5)	Ochraceous or luteous.
2	(3)	Head castaneous, also pleura and mesothorax... *dilutus*, Cress.
3	(4)	Head black, mouth-parts pale..... *marginicollis*, Nort.
4	(2)	Head black, mouth-parts and orbits pale..... *Rileyi*, Cress.
5	(8)	Dull rufous or chestnut (and black).
6	(7)	Segments of abdomen darker at apex..... *inæquidens*, Nort.
7	(6)	Segments of abdomen with pale line at apex.. *lineatus*, Kirby.
8	(11)	Black, thorax partly rufous.
9	(10)	Legs black..... *bardus*, Say.
10	(9)	Legs white..... *caryæ*, Nort.
11	(1)	Black, thorax black.
12	(13)	Abdomen partly rufo-testaceous.... ..... *rubi*, Harris. var. *hudsonicus*, Kirby.

Digitized by Google

13 (12) Abdomen black.
14 (21) Tegulæ and collar black.
15 (16) Legs black.....*scelestus*, Cress.
16 (15) Legs partly white.
17 (18) Third joint of antennæ much longer than fourth..*atratus*, n. sp.
18 (17) Third joint of antennæ about equal to fourth.
19 (20) Wings pale fuliginous, irridescent.....*nigrellus*, Cress.
20 (19) Wings hyaline, faintly clouded at base..... ♀ *tiliæ*, Nort.
21 (14) Tegulæ and collar pale.
22 (27) Larger species, length about .25 inch.
23 (24) Legs below trochanters reddish white, base of femora darker..... .....*medius*, Nort.
24 (25) Knees, anterior tibiæ above, and base more or less of the two posterior pair white.....*irrogatus*, Cress.
25 (26) Knees, tibiæ, except tips, and four anterior tarsi except apex, white.....*atracornus*, MacG.
26 (23) Knees, tibiæ, except tips of posterior, and four anterior tarsi, white.. .... ♂ *tiliæ*, Nort.
27 (22) Smaller species, length .18 inch ; knees, tibiæ and base of tarsi white.....*parcus*, Cress.

TENTHREDO MELANOSOMA, *n. sp.*

Female—Length, 12 mm.; black, mouth-parts and anterior legs touched with white. Head large, front deeply channeled at each side of ocelli, and slightly roughened, face below antennæ polished; antennæ rather slender, third joint one-quarter longer than fourth (terminal five joints are wanting); clypeus emarginate, with a quadrangular white spot on each side, labrum, base of mandibles and palpi also white. Thorax opaque, without distinct punctuation ; anterior legs with a line on apex of femora, a line on the tibiæ, and the tarsi largely, yellowish-white ; a yellowish-white line also on intermediate tibiæ within; intermediate tarsi and apical joint of posterior piceous; wings hyaline, slightly infumated beyond middle; abdomen entirely black.

Described from one specimen received from Mr. Wickham, taken by him at Fort Wrangel, Alaska. It seems to be quite distinct from any of the described American species.

Digitized by Google

TENTHREDO NIGRISOMA, *n. sp.*

Female—Length, 13-14 mm.; black with pale legs; head very large, wider than thorax; frontal ridges well marked, antennæ slender; dot at inner summit of eye, clypeus, labrum and base of mandibles yellow, palpi rufo-testaceous or yellowish. Thorax opaque, roughened, especially the scutellum; a yellow spot above posterior coxæ; legs, except coxæ and dots on trochanters, entirely rufous in one specimen, and much paler in the other which has the anterior pair, the middle femora and the posterior tibiæ almost yellow; wings yellowish-hyaline, stigma and nervures black, except basal half of costa, which is rufous. Abdomen wide, flattened, shining, entirely black.

Described from two specimens from Victoria, V. I., received from Mr. Taylor (dated 5th June, 1888) and Mr. Wickham. Closely allied to *T. nigricostata*, Prov., of which the type is in my possession, but is larger, the sculpture of the scutellum is coarser, the clypeus and labrum are yellow, the costa is in part rufous, and the posterior tarsi are unicolorous with legs.

TENTHREDO RUFICOLLIS, *n. sp.*

Female—Length, 13 mm.; black, with red legs. Head not nearly so large as in preceding species, and the frontal grooves very shallow; antennæ rather short and stout; clypeus, labrum and mandibles yellow, palpi testaceous. Thorax uniformly, not coarsely, roughened; tegulæ and a large quadrangular spot on collar bright rufous; legs, except coxæ, rufous, the anterior pair a little paler; wings hyaline, nervures piceous, stigma and costa paler. Abdomen long, narrow, shining, entirely black.

Described from one specimen received (through Mr. Fletcher) from Mr. Bean and captured at Laggan, in the Rocky Mts., B. C.

The described American species of Tenthredo are now so numerous (over eighty) that it necessitates a great deal of labour to go over all the descriptions. The males in some groups, such as *signata*, etc, are so variable and resemble each other so greatly that they cannot in many instances be satisfactorily separated by the present descriptions. The three species which I have described have the abdomen entirely black, and to assist in determining them I have prepared the following table of the species having the abdomen black, and which seem to be twenty-one in number. A table of the remaining species would be very desirable.

Digitized by Google

TENTHREDO, Linn. (species with black abdomen)

1 (6) Antennæ black with apical joints white.
2 (5) Four anterior tibiæ and tarsi testaceous.
3 (4) Collar yellow..... *antennata*, Kirby.
4 (3) Collar black..... *nigricollis*, Kirby.
5 (2) Four anterior tibiæ and tarsi black and white.... *grandis*, Nort.
6 (1) Antennæ wholly black.
7 (8) Wings violaceous, paler at apex..... ...*nimbipennis*, Nort.
8 (9) Wings fuliginous, darker at apex..... *fumipennis*, Nort.
9 (7) Wings hyaline or subhyaline.
10 (18) Legs black, varied with white or yellow
11 (12) Head above antennæ more or less yellow..... *lobata*, Nort.
12 (11) Head above antennæ black.
13 (16) Posterior tibiæ black.
14 (15) Tegulæ and edges of collar straw-white.... *flavomarginis*, Nort.
15 (14) Tegulæ and collar black..... .*melanosoma*, n. sp.
16 (17) Posterior tibiæ with white annulus, wings hyaline. *decorata*, Prov.
17 (13) Posterior tibiæ yellow except tip, wings yellowish hyaline..... *cinctitibiis*, Nort.
18 (10) Legs rufous, varied more or less with black or yellow.
19 (20) Pectus rufous..... *rufopectus*, Nort.
20 (19) Pectus black.
21 (22) Coxæ red..... *rufipes*, Say.
22 (23) Coxæ waxen yellow..... *zetes*, Kirby.
23 (21) Coxæ black, in whole or in part.
24 (25) Scutellum yellow..... *cogitans*, Prov.
25 (24) Scutellum black.
26 (35) Labrum and clypeus (in part) yellow.
27 (28) Femora black, except tip of anterior..... *concessa*, Nort.
28 (29) Femora black at base only..... *atrocærulea*, Prov.
29 (27) Femora largely red or testaceous.
30 (31) Posterior legs black, except apical joint of tarsi..... *uniformis*, Kirby.
31 (32) Posterior tarsi and tip of tibiæ black or piceous..... *erythromera*, Prov.
32 (30) Legs rufous, except coxæ.
33 (34) Tegulæ and collar black..... *nigrisoma*, n. sp.
34 (33) Tegulæ and edges of collar rufous..... *ruficollis*, n. sp.
35 (26) Labrum and clypeus black ..... *nigricostata*, Prov.

Digitized by Google

THE COLEOPTERA OF CANADA.

II. The Scarabaeidæ of Ontario and Quebec.

BY H. F. WICKHAM, IOWA CITY, IOWA.

The beetles of this family are more characteristic of Southern latitudes than of cold climes like Canada; of about six hundred species known from America, north of Mexico, only ninety-six are recorded from the Provinces which form the subject of the present paper. From all other families they may at once be known by the antennæ, terminating in a club composed of lamellæ or plates, which are capable of close opposition or of separation at the will of the insect. The antennæ of the Lucanidæ somewhat resemble them, but the leaves (or rather plates) are not capable of being closely brought together. The only insect in this country which would be likely to cause a doubt to arise in the mind of anyone is *Nicagus*, described below, in which the lamellæ are not quite approximated on their faces, but the form is decidedly not that of a Lucanid, and no serious trouble would follow its study. The legs of all the Scarabaeidæ are fossorial, often very highly so.

The larvæ are elongate fleshy grubs (fig 20, 2, larva of *Lachnosterna*), usually whitish in colour, with a black or brown head; the segments of the body are transversely wrinkled and the tip of the abdomen bent under, so that when taken from the ground the larva lies on its side. In motions they are slow, in feeding habits diverse—those of the Laparosticti or Coprophaga living in dung or other refuse matter, such as old skins and feathers, thus rendering man much valuable aid as scavengers, by removing from sight and smell a great deal of filth. The larvæ of the Melolonthini feed on roots of living plants, and often do vast damage, while those of the Pleurosticti eat various substances—some of them roots, others old dung, others rotten wood, while still others occur in the nests of ants.

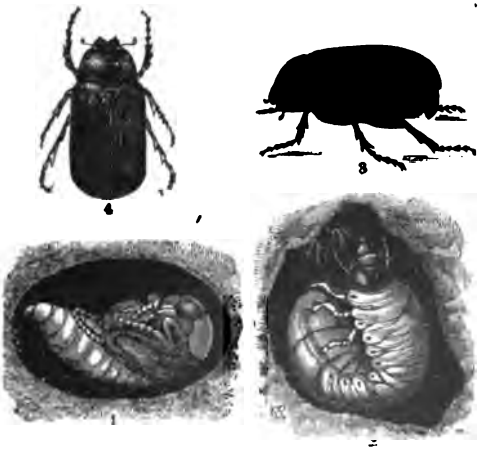


Fig. 20.

Digitized by Google

Nearly all the North American genera have been treated from time to time by Dr. Horn, and his papers may be found in the Transactions of the American Entomological Society for the past twenty years. Some of these essays are not now easily obtainable, and while the Doctor has, with his accustomed care, elaborated the characters useful in synoptic work in such a way as to leave apparently little new to be discovered, it is hoped that to many of the readers of the CANADIAN ENTOMOLOGIST the present paper, by bringing together in one easily accessible place the scattered material necessary for a study of the species of Old Canada, may not be useless nor unwelcome. The tables are based on the studies of Dr. Horn, and in one or two cases I have used his own entire in small genera, in which case due credit will be found to be given. In other instances I have been able, having a less number of species to handle, to use more evident characters, such as colour and size in the separation of species. It must be understood that these tables apply to the forms of East Canada *only*, and must not be used for the beetles of the West Coast nor of the United States generally, though many forms from the New England and other Eastern States can be identified with proper care.

It has been thought best, in order to avoid a long, complicated generic table, to treat the family in three divisions, as proposed by Dr. Leconte in the Classification. They may be distinguished structurally as follows; the notes succeeding will make the primary separation more easy to beginners :—

"I. Abdominal spiracles situated *in the membrane* connecting the dorsal and ventral corneous plates, the last one covered by the elytra..... *Laparosticti.*

II. Abdominal spiracles in part situated on the superior portions of the ventral segments, the last one usually visible behind the elytra; the rows of spiracles feebly diverging..... *Melolonthinæ.*

III. Abdominal spiracles (except the anterior ones) situated in the dorsal portion of the ventral segments, forming rows which diverge strongly. Last spiracle usually visible behind the elytra..... *Pleurosticti.*"

Aside from the characters given above, the Laparosticti or Coprophaga may be ordinarily known by the possession of the following characters: Form compact, though sometimes moderately elongate; legs usually highly fossorial, claws simple, suture separating clypeus from front of head not transverse, but extending up towards the vertex. The males are often armed with horns or tubercles on the head and thorax. In the absence

Digitized by Google

of other more technical knowledge, their dung-eating habits will separate most of them from the other sub-families. The Melolonthinæ (of which the "June-bugs" are good examples) are usually of looser, more slender build, the legs especially being elongate and the tarsi sometimes very slender. The clypeal suture is transverse, not extending up on the head, and the club of the antennæ is often elongated in the males. They are entirely vegetable feeders, and occur on leaves and flowers, or flying in the evening—never in dung. The Pleurosticti have mostly very similar habits in the beetle state, though *Ligyrus*, which somewhat resembles a *Lachnosterna* in form, but with stouter legs and shorter tarsi, is found under old dung-heaps (not in fresh manure), and *Cremastochilus* occurs in ants' nests. They are ordinarily heavily-built insects, though not always so, and in lack of knowledge of the characters presented by the spiracles, the beginner must rely chiefly on the specific descriptions for classifying his specimens, since I am unable to give other means for distinguishing them as a group, though readily placed properly by anyone who has any acquaintance with the family.

The generic key to the Coprophaga, which follows, is primarily based on the "Classification," though for minor divisions I have not scrupled to use such characters as colour and size—the main object being, of course, the easier identification of their specimens by beginners and others who have not access to libraries, either public or private. Their further study may easily be prosecuted, by those who wish it, at the expense of purchase of the works mentioned above.

TABLE OF GENERA OF COPROPHAGA.

A. Abdomen with six visible ventral segments.

b. Antennæ with 8 to 10 joints. Mandibles concealed by clypeus except in *Ægialia*.

c. Hind tibiæ with a single terminal spur (except in Canthon nigricornis), form shorter, rounded.

d. Middle and hind tibiæ slender, but little expanded at tip. Head and thorax never horned in either sex..... *Canthon.*

dd. Middle and hind tibiæ much expanded at tip, horns often present.

e. Larger species (.32 to 1.10 in.), no onychium.

Colour black..... *Copris.*

Colours metallic and green..... *Phanæus.*

Digitized by Google

ee. Smaller species, .14 to .34 in. Onychium present..... *Onthophagus.*

cc. Hind tibiæ with two spurs. Species oblong-convex or subcylindrical, usually small.

f. Mandibles visible beyond the clypeus..... *Ægialia.*

ff. Mandibles not visible beyond the clypeus.

g. First five striæ of elytra reaching apical margin (in the Canadian species)..... *Pleurophorus.*

gg. First five striæ not reaching apical margin. Head punctured or slightly plicate.

h. Outer apical angle of hind tibiæ prolonged, spiniform ..... *Atænius.*

hh. Outer apical angle of hind tibiæ obtuse.

Front tibiæ strongly toothed on outer margin..... *Aphodius.*

Front tibiæ with outer teeth obtuse except at tip..... *Dialytes.*

bb. Antennæ 11-jointed, mandibles prominent, visible from above; form often very convex, rounded.

i. Club of antennæ very large, lenticular. Brown or spotted species.

Eyes partially divided by sides of head. Males with short flattened horn..... *Bolboceras.*

Eyes entirely divided. Males with long slender horn..... *Odontæus.*

ii. Club of antennæ looser, more flattened. Black bluish or greenish species..... *Geotrupes.*

AA. Abdomen with five visible ventral segments.

Tarsi with distinct bisetose onychium. Thorax strongly narrowed before and behind, angulate at middle. Sculpture not very rough..... *Nicagus.*

Tarsi with distinct claws, no onychium. Thorax less narrowed anteriorly, not angulate at middle. Sculpture very rough *Trox.*

CANTHON, Hoffm.

The Canadian species are black or slightly bronzed insects which may be seen rolling balls of excrement from place to place. These balls are buried and the eggs deposited therein, thus ensuring the larvæ a supply of food. They may easily be distinguished from the three following

Digitized by Google

genera by the much more slender middle and hind tibiæ, which, though very slightly expanded at the tip, are not triangularly dilated. The clypeus has prominent teeth at middle. They may be separated as follows:—

A. Small species, .25 to .35 in., clypeus 6-dentate, hind tibiæ with two spurs..... .....*nigricornis*, Say.

AA. Larger species, .40 to .76 in., clypeus bidentate, hind tibiæ with one spur.

Prothorax distinctly granulate.....*lævis*, Drury.

Prothorax without raised granules, simply scabrous.....*chalcites*, Hald.

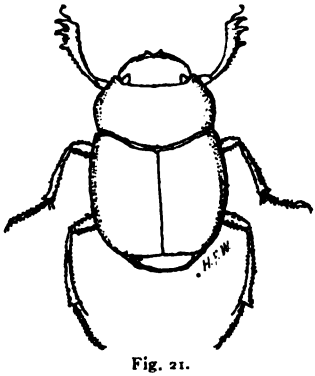


Fig. 21.

Fig. 21 represents *Canthon lævis*.

COPRIS, Geoff.

The species of this genus do not transport excrement in balls, but bury it in burrows on the spot. The males have the head or thorax or both variously tuberculate or horned, as in *Onthophagus*, from which they differ by the larger size and the absence of bristle-tipped onychium between the claws. The table gives the chief points of difference:

A. Elytra with eight striæ, front of head semicircular.

Clypeus evenly and densely punctured all around. Size large, .52 to .70 in.....*anaglypticus*, Say.

Clypeus densely punctured at sides, nearly smooth at middle. Size small, .32 to .44 in.....*minutus*, Dru.

AA. Elytra with seven striæ, front of head parabolic. Length, .80 to 1.10 in.....*Carolina*, Linn.

Fig. 22.

Fig. 22 represents *C. anaglypticus*, and fig. 23, *C. carolina*.

PHANÆUS, MacLeay.

The single species reported in the Canadian lists is a beautiful green insect, with the thorax usually coppery-red, the head, in the male, with a long horn. The length varies from .48 to .88 in. It is *P. carnifex*, Linn. The habits are the same as in *Copris*.

Fig. 23.

Digitized by Google

ONTHOPHAGUS, Latr.

Three species are known from Canada. They are found in dung, under which they burrow in the same manner as *Copris*. They are thus distinguished:

A. Larger species (.16 to .34 in.). Thorax of ♂ protuberant anteriorly.
Black, not shining; carina of vertex in male simple, not produced at the extremities..... *Hecate*, Panz.
Greenish or bronzed; carina of vertex produced at the extremities into horns or acute tubercles in the ♂ *Janus*, Panz.

AA. Smaller species (.14 to .20 in.). Thorax of male without protuberance.
Black, feebly shining..... *pennsylvanicus*, Har.

Some of the specimens of *O. Janus*, in which the head of the males has merely an acute tubercle at the ends of the vertical carina, and in which the colour is a bright bronze or metallic green, have been separated under the name *Orpheus*, Panz.

ÆGIALIA, Latr.

But one species, *Æ. conferta*, Horn, has been recorded from Old Canada. It is a small insect (.14 to .18 in.), piceous-black or brown in colour, oblong-convex, somewhat broader behind. The thorax has a distinct basal marginal line; the spurs of the hind tibiæ are rather short, broadly expanded at tip, with a translucent border. Other species of this genus will no doubt occur later, but the above characters will distinguish it from any heretofore known in North America.

PLEUROPHORUS, Muls.

A single species (*P. ventralis*, Horn) has been found in Ontario. It is an elongate, parallel, subcylindrical insect, .16 in. in length, piceous black, with reddish brown legs. The first five striæ of the elytra reach the apical margin, and it may thus be distinguished from any Aphodiide in the N. A. fauna. I have seen no specimens.

ATÆNIUS, Harold.

Small, slender, black insects, somewhat resembling *Aphodius*, but ordinarily smaller and more elongate. They frequently occur on the banks of streams. The species are very difficult to separate, but may be distinguished as follows, after the table given by Dr. Horn:

A. Posterior tibiæ with accessory spinule (a prolongation of the apical margin on the under side adjacent to the spurs).

Digitized by Google

Clypeus finely punctured, not rugose..... .....*strigatus*, Say.
Clypeus coarsely punctured or wrinkled.....*cognatus*, Lec.

AA. Posterior tibiæ without accessory spinule.

Black, shining; form slender, elongate; head closely punctate, clypeus broadly and feebly emarginate, elytral intervals convex, abdomen coarsely punctate.....*gracilis*, Mels.

The specimens referred to in the Canadian lists as *A. stercorator*, F., are presumably *strigatus*, which was formerly placed as a synonym of *stercorator*. I am not aware that *cognatus* has been found in Canada, but as it is known from the adjoining regions and might easily be mixed with *strigatus*, I have included it in the table.

Dialytes, Harold.

Small, dark-coloured insects, differing from *Aphodius* in having the teeth of the outer margin of the anterior tibiæ obsolete, except the apical one. As all the known North American species are found in Canada, I can do no better than to reproduce the table given by Dr. Horn, in his Monograph of the Aphodiini inhabiting the U. S.*

Intervals of elytra flat; clypeus not toothed.....*truncatus*, Mels.
Intervals finely carinate, striæ catenulate; clypeus with an acute tooth each side.....*Ulkei*, Horn.
Intervals strongly elevated; clypeus not toothed, thorax with deep median impression.....*striatulus*, Say.

Aphodius, Illiger.

These are commonly found in dung, and are in fact our most numerous scavengers. Several of them, such as *A. fimetarius*, a large species with bright red elytra; *A. fossor*, a large black species, and *A. inquinatus*, which has a black thorax and variegated elytra, are well known to every collector. Some of the Aphodii are very widely distributed, those mentioned above, as well as *granarius*, our common little black species, being found in both hemispheres. None of them construct balls for transportation, but burrow in and under the dung, and the larvæ go through their transformations on the spot. I have taken pupæ and perfectly fresh imagines of *A. stercorosus* under dry dung at the end of August, in Iowa.

From *Atænius*, the genus *Aphodius* is separable by the outer apical angle of the hind tibiæ being obtuse instead of produced and spiniform.

*Trans. Amer. Ento. Soc, XIV., 1887.

Digitized by Google

This character may be tolerably easily made out with a magnifying glass of even low power, and is, at any rate, not likely to cause much trouble, as most of the species can be separated by their facies after a little experience. The Canadian species of *Atænius* are all black, the legs often a little paler, while the *Aphodii*, on the other hand, are usually more or less parti-coloured. From the other neighbouring genera of the group it is sufficiently easily distinguished by the characters given in the table.

The following synopsis is purely artificial, and some of the variable species occur in it twice, but as the object of these papers is simply to make the identification of their species easier for beginners, and not to offer new schemes of classification, it has been thought best to seize upon the most easily seen characters. Immature specimens are easily recognized, as a rule, by the softness of their integuments, and excluding these, we can use colour as a guide to many of the species. I have therefore separated them as follows :

A. Scutellum long (¼ to 1-5 the length of the suture), species large.
Anterior tibiæ serrulate above the teeth. Colour black, .40 to .44 in..... *fossor*, Linn.
Anterior tibiæ not serrulate above the teeth. Colour variable, .24 to .40 in..... *hamatus*, Say.

AA. Scutellum short (not more than ⅛ to 1-10 the length of the suture), size variable.

b. Colour above uniform black or piceous black, tip of elytra sometimes reddish.

c. Body beneath black or piceous, varying to brownish.

d. Front distinctly trituberculate.
First joint of hind tarsus not longer than next two, .16 to .25 in..... *granarius*, Linn.
First joint of hind tarsus slightly longer than next two, .18 to .22 in..... *ruricola*, Mels.
First joint of hind tarsus equal to next three, .14 to .20 in..... *vittatus*, Say., *var.*

dd. Front without tubercles.
Small species, .16 to .20 in. Elytra reddish at tip..... *terminalis*, Say.
Larger, .28 to .36 in. Elytra unicolorous..... *oblongus*, Say.

cc. Body beneath not black (abdomen, metasternum and legs pale yellow,) .18 to .24 in..... *bicolor*, Say.

Digitized by Google

bb. Colour above not uniform black nor piceous black. Variable.

e. Elytra vittate, or spotted, or both.

Large, margins of head and thorax paler, .26 to .28 in.....*leopardus*, Horn.

Smaller, head black, anterior angles or entire sides of thorax paler, .18 to .22 in.....*inquinatus*, Fabr.

Sides of thorax not paler.

Smaller (.16 to .20 in.), abdomen black. *vittatus*, Say.

Larger (.18 to .24 in.), abdomen yellow.....*bicolor*, Say, *var.*

ee. Elytra not distinctly vittate nor spotted, sometimes fuscous.

f. Thorax black or piceous, sides more or less yellow or reddish.

Elytra bright red, .26 to .34 in.....*fimetarius*, Linn.

Elytra of greasy aspect, pubescence well-marked, colour almost fuscous, .18 to .26 in. *femoralis*, Say.

Elytra shining, pubescence feeble, deciduous, colour more yellow than fuscous, .22 to .30 in.....*prodromus*, Brahm.

ff. Thorax black, sides not yellowish, .28 to .30 in.....*rubripennis*, Horn.

fff. Ferruginous brown, head and thorax slightly darker, .14 to .16 in.....*lentus*, Horn.

Two of the names (*A. hyperboreus* and *A. dentiger*) which occur in the Society's List do not appear in the above table. The former is a variety of *hamatus*, with fainter striæ and flat interspaces, while the reference of a Canadian species to *dentiger*, otherwise known only from South-western Texas and Arizona, is almost certainly incorrect.

Bolboceras, Kirby.

Two species are known in North America, of which only the first is reported from Canada. They may be separated thus:

Colour uniform brown, shining.....*lazarus*, Fabr.

Colour above yellow, head black, thorax more or less black at base and on disk. Elytra with suture and apex black.....*farctus*, Fabr.

Digitized by Google

Odontæus, Kl.

The males of this genus may easily be known from those of *Bolboceras* by their long slender cephalic horn. The females may be placed in their proper genus by the complete division of the eyes by the side of the head. Two species are known from Old Canada, the males of which may be separated by the following table, the characters used having been pointed out by Dr. Horn. Unfortunately, I have seen no females and am unable to give characters for their specific distinction:

Horn of head fixed, less slender.....*cornigerus*, Mels.

Horn of head moveable, more slender.....*filicornis*, Say.

Geotrupes, Latr.

The three recorded Canadian species are large insects, bronzed, greenish or purplish in colour, easily found in dung during the summer. They do not transport balls, but burrow under the mass. The members of this genus have been very thoroughly studied by Jekel, Horn and Blanchard, so that new characters for their separation can hardly be devised. After study of their tables I offer the following, essentially that of Dr. Horn:

First joint of hind tarsus shorter than next three; claws of middle tarsi chelate in ♂.....*splendidus*, Fabr.

First joint of hind tarsus equal to next three; claws of ♂ normal.

Elytral striæ with coarse crenate punctures.....*Egeriei*, Germ.

Elytral striæ with rather fine punctures.....*Blackburnii*, Fabr.

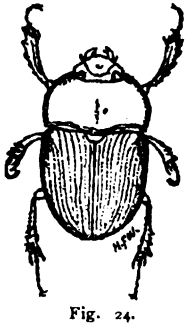


Fig. 24.

Fig. 24 shows a specimen of *G. splendidus*.

Nicagus, Lec.

The only species is *N. obscurus*, Lec., a reddish-brown or blackish-brown insect, something over a quarter of an inch in length; clothed with short, nearly white hair. The antennal club is large, but the lamellæ do not touch one another at base, though they sometimes meet at the tips. The thorax has a distinct angulation of the sides behind the middle, and is fimbriate with rather long hairs. Dr. Leconte says it has been found flying around heaps of putrid fish,—this is the only record of the habits that I have met with.

Digitized by Google

TROX, Fabr.

The species of Trox are rough, dirty-looking, brown insects, usually more or less incrusted with earthy matter, found under dry carrion and old hides or feathers. They are quite uniform in appearance and are consequently not readily separated, more particularly as they vary to some degree in sculpture within specific limits. I am entirely unable to find constant and easily recognized characters on which to make groups otherwise than those established by Dr. Horn, and the table, therefore, follows his own exactly:

A. Scutellum hastate (*i.e.*, shaped like a spear-head). Large species. Sides of prothorax near base often with feeble incision. Elytra with rows of distinct smooth tubercles. Length, .48 to .66 in. ..... *punctatus*, Germ.

AA. Scutellum oval, species smaller. Hind femora without spinules on posterior margin.

b. Tubercles of elytra with black setæ.

Tubercles elevated, setæ erect, rather long. Length, .25 to .28 in. ..... *erinaceus*. Lec.

Tubercles indistinct, setæ short. Length, .36 to .44 in. ..... *capillaris*. Say.

bb. Tubercles of elytra with pale or rufous hairs or scales.

c. Elytra distinctly tuberculate.

d. Thoracic ridges straight or nearly so.

Elytral margin serrulate or crenulate at base. Length, .24 to .32 in. ..... *sordidus*, Lec.

Elytral margin entire at base. Length, .40 to .48 in. ..... *unistriatus*, Beauv.

dd. Thoracic ridges very sinuous. Length, .20 to .24 in. ..... *terrestris*, Say.

cc. Elytral tubercles very indistinct, being replaced by patches of setæ.

Anterior tibiæ not serrulate above the lateral tooth. Length, .25 in ..... *æqualis*, Say.

Anterior tibiæ serrulate near the base. Length, .20 to .28 in. ..... *scaber*, L

Digitized by Google

CORRESPONDENCE.

OCCURRENCE OF TRIPTOGON OCCIDENTALIS IN MAITOBA.

Sir,—About four years ago a specimen of this moth came to light one evening through an open window. I saw no more until last year, when I found two large pupæ at the foot of a white poplar tree. One of them produced the perfect insect, but the other was unfortunately a failure, and only produced a number of Tachinous flies. I also caught, attracted by light, a fine female moth which laid several eggs. Unfortunately I was unable to watch them very closely, and several hatched out, and the larvæ died. I succeeded, however, in partially rearing one on the leaves of the white poplar. This is a rough description of the larva:—Colour, polar-green. Head large and square and with an inverted v mark. Yellow or gold ring between first and second, and second and third segments. Yellowish-white stripe from anal horn, which is very small, and whitish forward to the last pair of legs. This after 3rd or 4th moult. After 5th moult, the head became yellowish-white with a pinkish tinge-horn almost disappeared; the line from the horn assumed a purplish shade; slight oblique lines on each segment. Eight pink spiracles on either side. Pro-legs and claspers, pink, and above the anus a heart-shaped patch of pale bright green. Colour, whitish poplar-green, skin very rough, 2 yellow bands between first segments as before. Shortly after taking this note the larva died. From time to time I have seen a few specimens of *Macroglossa bombyliformiz*, (I use the name of the English lists as I am unable to see any difference, and in any case you will know the insect I mean), but last year it and *M. fuciformis* simply swarmed on the blossom of the wild plum and wild black currant. At the same time I took two specimens of a species of Deilephila closely allied to *D. Galii*. This is the second species of this genus that I have taken.

As Southern Manitoba may be unknown to many of your readers, a short description of my place may be of some interest. I am some 120 miles west of Emerson, and 12 miles north of the boundary line. It is intersected by a stream running in a deep ravine, the banks of which are clothed with oak, white and black poplar, elm, birch, ash-leaved maple, willows of very many species, ash, cherries, Saskatoon *Amelanchier alnifolia*, cranberry, gooseberry, currants, plum, hazel and Cratægus thorn. The prairie, too, is not the generally conceived grassy sea, but is dotted with clumps of poplar, willow, etc., and with here and there patches of *Elæagnus argentea*, in prairie parlance "wolf-willow," roses, etc.

E. F. HEATH, the Hermitage, Cartwright, Manitoba.

Mailed July 6th.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, AUGUST, 1894. No. 8.

CANADIAN HYMENOPTERA—No. 5.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

This paper contains descriptions of some apparently new species of ichneumons from British Columbia. Most of these are contained in a very interesting collection made by the Rev. G. W. Taylor, during his residence at Cedar Hill, near Victoria, V. I. When Mr. Taylor left Ottawa to return to Victoria, about three years ago, he very generously handed over to me his Hymenoptera, only asking that I should publish a list of the species. To enable me to fulfil this request, I have found it necessary to first prepare descriptions of the new species.

Sub-family ICHNEUMONINÆ.

ICHNEUMON TAYLORII, n. sp.

Male—Length, 15–16 mm. Ferruginous varied with yellow. Head ferruginous on vertex, the posterior margin, a spot enclosing the ocelli and another above the antennæ, black; face, cheeks below, mandibles and palpi yellow; antennæ long and slender, black, with scape yellow. Thorax with the sutures more or less black; the mesonotum, upper margin of pleura and base of metathorax ferruginous; remainder yellow, including the scutellum; legs almost yellow, the posterior femora, apical half of tibiæ and the tarsi pale ferruginous; coxæ yellow, the middle and posterior pairs with a black spot within; wings yellowish hyaline, nervures piceous, stigma yellow, costa ferruginous. Abdomen with the basal segments varied with yellow, the terminal ones almost ferruginous; postpetiole and base of following segment aciculated, gastrocœli shallow; one specimen has a narrow black line at base of segments 3–5, the other has only a black spot on petiole beneath.

This handsome species is described from two ♀ specimens from Victoria, V. I., collected by my friend, the Rev. G. W. Taylor, F. R. S. C., after whom I have much pleasure in naming it.

Digitized by Google

ICHNEUMON OCCIDENTALIS, n. sp.

Female—Length, 11 mm. Rufo-ferruginous. Head rufous, subtuberculate beneath antennæ, face sparsely punctured; antennæ black, thickened towards apex, with a white annulus, scape rufous. Thorax mostly black; the mesonotum, scutellum and spot at base of metathorax rufous, legs entirely rufous, except apical joint of tarsi, which is brownish. Abdomen rufous; postpetiole and two following segments closely opaquely punctured, remaining segments shining; gastrocœli oblique, linear; a strong transverse depression near apex of the same segment.

Described from one ♀ specimen taken at Victoria, Vancouver Island, in Nov., 1890, by Mr. Taylor.

PLATYLABUS PACIFICUS, n. sp.

Female—Length, 9 mm. Black, with rufous abdomen and legs. Head small, closely punctured; palpi reddish, antennæ entirely black, slightly stouter beyond the middle. Thorax closely punctured, the pleuræ more coarsely; metathorax rugose, excavated behind; carinæ indistinct, angles subspinose; legs rufous, coxæ and trochanters black; wings subhyaline, stigma and nervures reddish, areolet pentagonal. Abdomen rufous, polished, except postpetiole, which is aciculated, with two dorsal carinæ not reaching the apex; ovipositor slightly exserted.

Described from one ♀ specimen from Vancouver Island (Taylor).

CENTETERUS CANADENSIS, n. sp.

Female—Length, 5 mm. Black; legs and band on abdomen rufous. Head large, vertex and cheeks polished, face punctulate; mandibles rufous, palpi pale; antennæ black, scape oval, red beneath, joints 3-5 subequal, about twice the length of the remaining joints, which are about as broad as long. Thorax black, shining, the mesonotum and pleuræ with sparse faint punctures, the metathorax distinctly areolated, the angles spiniform; legs rufous, the posterior coxæ, tibiæ at apex and tarsi piceous. Abdomen polished, first and apical segments black; two, three and base of four rufous.

Descriped from 3 ♀ specimens from Victoria, V. I. (Taylor.)

HERPESTOMUS FLAVICOXÆ, n. sp.

Male—Length, 6 mm.—Black, with rufous legs. Head black, front rounded, sparsely punctate; clypeus, mandibles and palpi yellow; antennæ stout, black above, piceous beneath, scape yellow. Thorax black,

Digitized by Google

mesonotum sparsely punctulate ; scutellum with fine central carina ; metathorax distinctly areolated, the posterior face striated ; legs red, four anterior coxæ and trochanters yellow, posterior coxæ black, tipped with yellow, trochanters yellow, spotted above with black, tips of posterior tibiæ and their tarsi brownish ; wings hyaline, a little dusky, stigma and nervures dark, areolet rather large, pentagonal. Abdomen black, with the incisures and lateral margins rufo-testaceous.

Described from one ♂ specimen from Victoria, V. I. (Taylor.)

Sub-family CRYPTINÆ.

CRYPTUS VANCOUVERENSIS, n. sp.

Female—Length, 11-15 mm. Black, with rufous abdomen and legs. Head transverse, not much swollen behind the eyes, closely punctured, inner orbits narrowly whitish ; a rounded shining tubercle below the antennæ ; clypeus swollen, shining, touched with white in one specimen ; palpi blackish ; antennæ long and slender, black, the scape rufous beneath. Thorax entirely black ; the pleuræ and metathorax closely, almost rugosely, punctured ; metathorax not distinctly areolated ; mesonotum and scutellum shining, finely and sparsely punctulate ; wings fuliginous with violaceous reflections ; tegulæ piceous ; legs, including coxæ and trochanters, bright red ; terminal joint of tarsi piceous ; posterior tibiæ darker toward apex, the tarsi yellowish. Abdomen entirely red, highly polished ; the ovipositor as long as abdomen without petiole, red, the sheaths black.

This handsome species is described from three ♀ specimens from Victoria, V. I. (Taylor.)

CRYPTUS VICTORIENSIS, n. sp.

Female—Length, 7-9 mm. Black ; abdomen and legs mostly rufous. Head subrugosely punctured beneath antennæ, closely but more finely above ; inner orbits and edge of clypeus narrowly white ; antennæ long, slender, black, with a short white line above on joints 9-11. Thorax coarsely punctured, but somewhat shining, scutellum polished, with few punctures ; metathorax rounded, with transverse carina, but not areolated ; collar, tegulæ, scutellum and posterior angles of metathorax with minute white dots ; legs rufous, including coxæ, posterior tibiæ and tarsi black, the former with a pale annulus near the base, the latter with joints 2-4 white in one specimen, but partly black in the other ; wings almost hyaline, areolet small, nearly quadrangular. Abdomen polished rufous ;

Digitized by Google

postpetiole with scattered punctures, second segment strongly and densely punctured, third more finely, remainder polished, scarcely punctate; petiole partly and the three or four terminal segments black, the latter narrowly margined with white; ovipositor one-half as long as abdomen, sheaths black.

Described from two ♀ specimens from Victoria, V. I. (Taylor). A pretty little species resembling somewhat in coloration *C. extrematis*, Cress., but easily separated by the smaller size and the much coarser punctuation.

CRYPTUS FLAVIPES, n. sp.

Female—Length, 4 mm. Black, with yellowish legs. Head small, finely punctulate, vertex shining; spot on mandibles and palpi pale; antennæ wanting. Mesonotum polished; metathorax rounded, closely punctured, without distinct carinæ; legs, including coxæ, pale rufo-testaceous, tips of posterior tibiæ and tarsi darker; tegulæ pale, nervures brownish, stigma paler. Abdomen with first and second segments closely, finely punctulate; terminal segments with apical margins indistinctly whitish; ovipositor as long as abdomen, red, with piceous sheaths.

Described from one ♀ specimen from Victoria, V. I. (Taylor.)

CHÆRETYMMA ASHMEADII, n. sp.

Female—Length, 8 mm. Black, with red legs. Head transverse, as wide as thorax, polished, eyes prominent, front with sparse punctuation, slightly concave, with a small shallow basin above each antenna; cheeks polished, impunctate; face below antennæ finely opaquely punctured; palpi pale; antennæ wanting. Thorax entirely black, very slightly pubescent; sides of prothorax striated; mesonotum prominent, the middle lobe slightly advanced, polished with sparse fine punctures, pleuræ closely, not coarsely, punctate; scutellum polished; metathorax closely punctured, opaque; posterior transverse carina distinct, but metanotum not areolated; legs, including coxæ and trochanters, entirely red; wings rather small, slightly infumated, nervures and stigma piceous, areolet medium in size, subpentagonal, considerably higher than wide. Abdomen as long as head and thorax, black; first segment gradually expanded to tip, finely opaquely punctulate and with fine lateral carinæ; second segment as wide as long, also finely opaquely punctulate, except at apex; remaining segments polished; the ovipositor longer than abdomen, red, with black, polished sheaths.

Digitized by Google

Described from one ♀ specimen from Victoria, V. I. (Taylor), and named after Mr. W. H. Ashmead, as a slight recognition of the invaluable assistance which I have received from him in my studies of the Canadian hymenoptera. He kindly examined this species, and states that it "comes nearest to *Cryptus velox*, Cr., judging from description. I have another specimen in my collection from Colorado, but with the ovipositor a little shorter than in your specimen." It differs, however, from *C. velox* (to which I refer a species taken at Ottawa) in the entirely red legs, the darker wings with narrower areolet, the finer sculpture of metathorax, the shorter ovipositor with non-pubescent valves, etc., although the general appearance of the two species is much the same.

HEMITELES OCCIDENTALIS, n. sp.

Female—Length, 5 mm. Black, with rufous abdomen and legs. Face subtuberculate; edge of clypeus and mandibles rufous, palpi pale; antennæ piceous, the scape and basal joints of flagellum partly rufous. Metathorax areolated; legs, including coxæ, rufous, also the tegulæ. Abdomen polished; the petiole black, and terminal segments dusky; ovipositor as long as abdomen, sheaths piceous.

Described from one ♀ specimen from Victoria, V. I. (Taylor.)

HEMITELES PICEIVENTRIS, n. sp.

Female—Length, 3.5 mm. Black, with piceous abdomen and pale legs. Head finely punctulate above; palpi pale, antennæ piceous, 23-jointed. Thorax shining, the mesonotum finely punctulate, metathorax not spined, carinæ feeble; legs yellowish, the coxæ and posterior tarsi almost piceous; tegulæ pale, nervures and stigma brownish. Abdomen piceous, shining, the first and second segments finely punctulate, ovipositor scarcely as long as abdomen.

Described from one ♀ specimen from Victoria, V. I. (Taylor.)

CREMNODES CANADENSIS, n. sp.

Female—Length, 4.5 mm. Rufo-testaceous. Head viewed from above sub-quadrate, the face swollen as in Exochus, punctulate beneath antennæ; eyes small; antennæ 18-jointed, almost as long as body and moderately robust. Thorax more strongly constricted than in Pezomachus; metathorax sharply truncate and the angles strongly spined. Abdomen with the first segment slender, not expanded posteriorly, remaining segments compressed laterally, truncate at apex and strongly polished, the second more than twice as long as all the others; ovipositor very short.

Digitized by Google

Described from one ♀ specimen from Queen Charlotte Islands, sent by the Rev. J. H. Keen to Mr. Fletcher. A very interesting wingless species, with rufous head and abdomen, and testaceous thorax and legs. The compressed abdomen is more like that of an ophionid than of a cryptid.

PEZOMACHUS KEENII, n. sp.

Female—Length, 3–4 mm. Fulvo-ferruginous. Head slightly darker than rest of body; antennæ 19–20 jointed, more or less obscured toward apex; cheeks polished. Thoracic nodes subequal, not very prominent, faintly sulcate; legs concolorous with thorax. Abdomen ovate beyond the first segment, which is rather suddenly expanded posteriorly; terminal segments slightly yellow in one specimen; ovipositor very short, sheaths black.

Described from four ♀ specimens from Queen Charlotte Islands, collected by the Rev. J. H. Keen, after whom I have much pleasure in naming the species, as a recognition of his efforts to advance our knowledge of the insect fauna of this distant portion of the Dominion.

SUBDIVISION OF THE PIERINÆ BASED ON PUPÆ.

BY J. W. TUTT, F. E. S., LONDON, ENGLAND.

An oversight (*ante*, p. 167, line 27) leads me to state that it is in the Aporid section of the *Pierinæ* that the pupa has the abdominal segments 5 and 6 moveable, whilst in the Pierids proper only 5 is moveable. The *Pieridi* have until now always included the Aporid section; as a matter of fact, many European systematists have placed our *Aporia crataegi* in the genus *Pieris*.

There can be no doubt that *Aporia* represents a very ancestral form of the *Pierinæ*, and, as such, is structurally different in all its stages from its Pierid allies; at the same time I am firmly convinced that the *Aporidi* is as distinct from the *Pieridi* as is the *Anthocharidi*.

I am looking forward, with some degree of interest, to the records of observers which will tell us the American species of *Pierinæ* that have the pupæ with two (5 and 6) moveable abdominal segments (*Aporidi*); which species have but one (5) moveable segment (*Pieridi*), and which are solid (*Authocharidi*), and how far the structure of the pupa agrees with the neuration of these types.

Digitized by Google

AN OMITTED PHYCITID.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

I have not been able to find in the Philadelphia List of Lepidoptera the following species :—

DIORYCTRIA, Zell.

Reniculella, Grt. *(Pinipestis)*, N. Am. Ent., 67 ; Pack., Bull. Dep. Agr. Ent., xiii., p. 21, 23 ; Fifth Rep. on Insects Inj. to Forest and Shade Trees, 854 ; Romanoff, Mem. Sur les Lép. Tome vii., Ragonot id. 200, Planche xxii., fig. 12.

My type is in the British Museum, where it has been examined by M. Ragonot, who compares it in his description with the European *D. abietrella*, from which this authority finds it to differ structurally. The figure in M. Ragonot's magnificent work seems to me excellent. I take this occasion to express my dissent from the classification adopted in the Philadelphia List. In 1878 I separated the *Epipaschiinæ (Epipaschiæ)* from the *Phycitinæ (Phycidæ)*. The two groups I regard as divisions of the Pyralidæ, equal in value to the *Crambinæ* and *Galleriinæ*. So far as I can discover, I first drew attention to the peculiar structure of the female frenulum in the *Phycitinæ*. At the time I did not know that the old term *Phycis* (used also by Walsh for our American species) had been superseded by *Phycita*. Messrs. Scudder and Burgess first gave us genitalic species ; Lederer had used the genitalia for subgeneric and generic divisions, and latterly is followed by Smith. Now comes Mr. Hulst, whose mission seems to be to carry out the methods of other entomologists to extremes, and gives us genitalic subfamilies.

Besides the above-mentioned species of *Dioryctria*, Mr. Ragonot figures the following North American *Phycitinæ* originally described by me : *Salebria contatella* and var. *quinque punctella*, *Meroptera pravella*, *Dioryctria aurantiacella*, *Pyla scintillans*, *Nephopteryx scobiella*, *Ambesa laetella*, *Dioryctria (Pinipestis) Zimmermanni*, *Acrobasis tricolorella*, *A. demotella*.

In my paper alluded to above, Bull. U. S. Geol. Survey, I gave, for the first time in American scientific publications, figures of the neuration and descriptions of the structure of the *Phycitinæ*. At the time only the first part of my intended work was prepared for the printer. I had purposed the working out of all the American genera in my collection. We have now a most carefully written and beautifully illustrated work by M. Ragonot, which can be studied with pleasure and profit by all American students occupying themselves with the collection of these little but very interesting moths.

Digitized by Google

DESCRIPTION OF A NEW SPECIES OF DORYCEPHALUS.

BY HERBERT OSBORN, AMES, IOWA.

Dorycephalus platyrhynchus, n. sp.

♂—Head produced and very flat, rounded in front, wings reaching tip of abdomen; colour gray-brown. Length, 9 mm. Length of head, 2.3 mm.

Head thin foliaceous, margins very thin, a median, thicker space, which beneath widens to base of head, forming a convex keel. Eyes touching prothorax. Ocelli on margin of head, just in front of eyes, a rather obscure mottling of brown along the disk of the head and forming a rather distinct median stripe, a dark stripe under the tip of the head, dividing and passing along the margins of the keel, a distinct blackish line under the eye, and extended as a brownish stripe on thorax. Prothorax transverse, with five slightly elevated convex ridges, the anterior margin nearly straight, with slight sinuosities, the posterior margin concave in front of the scutellum. Scutellum wider than long, convex in front, with an acute point at the apex between bases of elytra, with a transverse furrow behind the middle, deflected laterally. Elytra strongly veined, costal margin arcuated, with a humeral furrow, very minutely punctate. Legs rather slender, anterior femora fuscous beneath. Middle and posterior femora with rows of fuscous dots forming a stripe beneath. Tibiæ fuscous beneath.

Described from two male specimens, one collected at Ames, Iowa, by Prof. C. P. Gillette, the other collected at West Point, Nebraska, by Prof. Lawrence Bruner.

Female larger than male; pale yellow, with dark median line on head and prothorax. Length, 14.5 mm. Head longer than in male, central carina above darker. Elytra short, reaching one-half way on to the 4th segment of the abdomen. Wings shorter, reaching nearly to posterior margin of the 2nd segment of the abdomen. Abdomen elongate and acuminate. First 6 segments about equal in length; 7th narrow, elongate and combining with remaining segments to form the sheath of ovipositor. Ovipositor long, the sheath simple beginning at the 5th ventral segment.

Since forwarding the description of the male a special student in entomology, Mr. E. D. Ball, has brought in another male and the female here described.

The larger size and elongate, slender abdomen gives this quite a different appearance from the male, but I think there can be no question as to the identity of the two forms. The specimen in hand has somewhat the appearance of being fresh from the pupa stage, on account of the lighter colour and soft appearance of the body, but the wings appear fully developed, and in other respects it indicates maturity.

Digitized by Google

SOME INDIANA ACRIDIDÆ.—III.

BY W. S. BLATCHLEY, TERRE HAUTE, INDIANA.

In the two preceding papers of this series 36 species and 3 varieties of Acrididæ have been recorded as occurring in Indiana. Since the last paper, published in the ENTOMOLOGIST for February, 1892, appeared, five additional species have been taken within the State, and many facts have been gathered concerning the life history, habits and range of the species previously recorded. Moreover, my private collection has been largely increased by exchange for specimens from other parts of the United States, and I have possessed myself of almost all the literature extant upon the group, so that I am enabled to clear up a few mistakes in synonymy which crept into my first papers.

ACRIDIDÆ.

ACRIDINÆ.

OEDIPODINI.

1. AULOCARA SCUDDERI, Bruner.

Aulocara Scudderi, Bruner, Proc. U.S. Nat. Mus., XII., 1890, 63.

This small locust was first taken in Indiana on July 6th, 1892, from the sandy bed of the old Wabash and Erie Canal, five miles north of Terre Haute, Vigo Co. Other specimens were secured at the same locality in September of that year, and in September and October of 1893.

On one side of the canal, at the point mentioned, is a large pond, occupying perhaps 50 acres of the Wabash River bottoms, and on the other side is a sandy hill or bluff of the river, which is covered with typical prairie grasses and plants. The locust has been found only in an area of about five acres, on the side of the hill, and in the bed of the canal. When disturbed it leaps vigorously, and without noise, for several times in succession; then, settling down on a sandy spot, it will allow a close approach, evidently relying upon the similarity of colour between its body and the sand to shield it from observation. According to Bruner, *loc. cit.*, it is a very common species west of the Mississippi; but this I believe, is its first record east of that stream, unless the species mentioned by McNeill, in his "Illinois Orthoptera,"* as *Philobostroma parva (?)*, be the same.

*Psyche, VI., 64.

Digitized by Google

2. SPHARAGEMON OCULATUM, Morse.

Spharagemon oculatum, Morse, Proc. Bost. Soc. Nat. Hist., XXVI., 1894, 232.

On August 1, 1892, I visited Lake Maxinkuckee, Marshall Co., Indiana, and in a sandy, fallow field, near the south-western border of the lake, I found this locust to be quite abundant in company with *Spharagemon bolli*, Scudder. They never leaped when disturbed, but used the wings to propel them in a flight of about 30 yards; the males making a faint crackling noise as they cleared themselves from the earth, while the females were noiseless. A number of pairs were taken in copulation on this date.

On August 17, 1893, I again visited the locality, and found the field to be in corn, but the *Spharagemon* was very common over about two acres of the most sandy portion. Resting on the soil between the rows, they were very difficult of detection, and eight times out of ten were not seen until flushed, unless they had previously been "marked down" as they alighted. A few were also taken from the sandy margin of the lake, but careful search over a wide extent of territory failed to reveal them elsewhere.

Without specimens for comparison, and from the literature at hand, I determined them doubtfully as *Spharagemon collare*, Scudder, and sent specimens so named to Prof. A. P. Morse, who was making a detailed study of the genus. He found that they differed from the type specimens of *collare* in Mr. Scudder's collection, and so described them as new, under the name cited above.

3. TRIMEROTROPIS MARITIMA (Harris). The Maritime Locust.

Locusta maritima, Harris, Ins. Inj. to Veg., 1862, 178.
Oedipoda maritima, Uhler, in Harris Rep., *loc. cit.*
Scudder, Bost. Journ. Nat. Hist. VII., 1862, 472.
Thomas, Syn. Acrid, N.A., 1873, 124.

Trimerotropis maritima, Stal, Recens. Orth., I., 1873, 135.
Scudder, Dist. Ins. N. Hamp., 1874, 378.
Thomas, Ninth Rep. St. Ent., Ill., 1880, 113.
Fernald, Orth., N. Eng., 1888, 45.

Digitized by Google

Among a number of Orthoptera which were collected by Prof. E. E. Slick at Michigan City, Indiana, on September 18, 1892, and forwarded to me, was a single ♀ of this species. I immediately returned it to him with the request that, if possible, he secure a number of others. On October 15, there having been several severe frosts in the meantime, he sent 18 additional specimens, 6 of which were ♂'s. At the same time he wrote concerning them as follows: "Some were found dead and others could but jump one or two feet. I did not realize when the first lot was sent how nearly these were like the sand, because they were so wild. They were never more than 100 feet from the edge of the water (Lake Michigan), and never along even the hillsides."

The only record which has come under my notice of the occurrence of *maritima* west of the Atlantic coast is the brief one given by Thomas in his Ninth Illinois Report, *loc. cit.*, where he says: "This has been discovered only in the extreme northern part of the State;" but he does not state when nor by whom it was taken. McNeill includes it in his list of the Illinois Orthoptera (PSYCHE VI., 64), on the strength of the above statement by Thomas.

Mr. Scudder, in his Distribution of Insects in N. Hamp., *loc. cit.*, writes of it as follows: "This curious grasshopper is a good example of mimicry, for it so closely resembles the colour of the sand on a sea beach that it is difficult to see it when alighted. It is found only in such localities, and reaches its northern limit about the narrow part of the State washed by the sea. South-west it extends at least as far as New Jersey."

TETTIGINÆ.

4. TETTIX ARENOSUS, Burmeister,

Tettix arenosa, Burmeister, Handbuch II., 1838, 659.

Tettix arenosus, Scudder, Proc. Bost. Soc. Nat. Hist., XIX., 1877, 90.
Bolivar, Essai Sur. les. Tettig., 1887. 95.

Tettix ornatus, Scudder, Bost. Jour. Nat. Hist., VII., 1862, 474 (In part.)
Thomas, Syn. Acrid., 1873, 184 (In part.)
(Not *Tettix ornatus*, Say.)

Digitized by Google

In Indiana this grouse locust is much less common than *T. ornatus*, Say, with which species it has been confounded by many writers. Burmeister's description was so short and unsatisfactory that unless one could examine his types it is impossible to determine what species he had at hand.

Bolivar, in his "Essai," separates the group containing *ornatus* from that containing *arenosus* by the difference in the relative length of the pronotum, but collectors of these insects know that this character is of little value on account of its great variation in the same species. Moreover, he gives the length of pronotum of *ornatus* as 7 5-9 mm., and states that it does not exceed the tip of the posterior femora. A glance at Say's description and figure will show that he was wrong concerning both of these points, as the length of pronotum there, and the average length in many specimens at hand, is about 11.5 mm.

Arenosus, as I have it separated in my collection, is a somewhat shorter and broader species than *ornatus*, and with the median carina of the pronotum and vertex much more distinct. The granulations on the pronotum are longer and more irregularly distributed, and, especially on the posterior half, have a tendency to arrangement in short, oblique waves or ridges, while the median sulcus of the face is wider in its lower half than in *ornatus*.

The general colour of *arenosus* is darker and the annulations of the antennæ and legs are much more distinct than in *ornatus*, which in colour is an exceedingly variable insect. But little practice is necessary to quickly distinguish the two species in the field.

Arenosus in this vicinity is found in small numbers about gravelly hillsides, and occasionally in company with *T. cucullatus* about the borders of streams, while *ornatus* is a very common species in dry upland woods.

5. TETTIX GRANULATUS (Kirby).

Acridium granulatum, Kirby, "Fauna Bor. Am., IV., 1837, 251."
Tettix granulatus, Scudder, Bost. Journ. Nat. Hist., VII., 1862, 474.
Thomas, Syn. Acrid. N. A., 1873, 182.
Bethune, Can. Ent. VII., 1875, 130. (Copy of Orig. Desc.)
Riley, Rep. U. S. Ent. Comm., I., 1877, 256, fig, 11.
Bolivar, Essai Sur. les Tettig, 1887. 91.
McNeill, Psyche, VI., 1891, 77.

Digitized by Google

Tettix ornata, Harris, Ins. Inj. to Veg., 1862, 186. (Not *Tettix ornatus*, Say.)

I have found this species in both Vigo and Fulton counties, and McNeill, *loc. cit.*, has recorded it from Franklin Co., Ind.

In Vigo Co. it is evidently scarce, as I have taken it only in winter from beneath logs, in the vicinity of the large pond mentioned above, under *Aulocara Scudderi*. In Fulton Co., 150 miles north, I found it very common in the depths of a tamarack swamp, in company with *Tettigidea polymorpha*, Burm.

In life, the inner wings of *granulatus* are bluish or bottle green, a character I do not remember to have seen noted by any previous writer.

It is an insect of wide distribution, extending from ocean to ocean, and northward through British America. Vigo county is probably near the southern limit of its range.

***

NOTES ON SOME OF THE SPECIES MENTIONED IN THE PREVIOUS PAPERS.

LEPTYSMA MARGINICOLLIS, Serville. (C. E., XXIV., 28.*)

The only habitat of this species in Indiana, known to date, is the margin of the large river bottom pond mentioned in my previous paper. This has been partially drained, and, as a result, the locust was quite scarce in the autumn of 1893. I was much surprised, however, to find there, on May 21st, a fully developed male, with soft, flabby wings, as though just moulted, though no others of any age were seen on that date.

TRUXALIS BREVICORNIS, Linn. (C. E., XXIII., 75.)

This has proven to be a rather common species about the margins of marshes, ponds and lakes. In Vigo county it reaches maturity about August 10th. It has been taken in Fulton and Marshall counties, thus extending its known range 150 miles northward.

CHRYSOCHRAON VIRIDIS, Scudder. (C. E., XXIII., 75.)

The brown form of this species far outnumbers the green one in this locality. It has been taken in copulation as early as July 15. The spring and early summer of 1892 were very damp, it raining almost every day in the month of May. In the latter part of July hundreds of dead and dying specimens of this species and of *Melanoplus bivittatus*, Say, were

*The references refer to the volume of Can. Ent. in which the species was previously mentioned by myself.

Digitized by Google

to be seen in the tops of iron weeds. They were principally ♀'s, and their death was probably due to the insect fungus, *Entomophthora calopteni*, Bessey, an interesting account of which appeared in Bull. 22, U. S. Dept. Agr., 1890, 104. The disease was, perhaps, more abundant on account of the young being exposed to so much dampness in May and June. In two instances females of *Melanoplus differentialis*, Thomas, were discovered feeding upon the dead bodies of *C. viridis*, the abdomens and soft portions of the thorax having been wholly devoured.

CHLOEALTIS CONSPERSA, Harris. (C. E., XXIII., 75.)

The ♂'s of this species are among the rarest locusts found in Indiana. Six years collecting have yielded me not more than as many perfect specimens. The ♀'s are by no means common, seldom more than four or five being seen in a day's collecting.

Mr. S. I. Smith* and Mr. S. H. Scudder† have each given an interesting account of the egg laying habits of the ♀ *conspersa*. On August 11th, 1893, I discovered a ♀ in the act of boring a hole in the upper edge of the topmost board of a six-plank fence. The abdomen was curved downward, and the forcipate valves of the ovipositor used as pinchers with which small pieces of the wood were broken off. When discovered, the abdomen was inserted nearly one-half an inch in the pine board, and the upper edge of the opening about the sides of abdomen was covered with small pieces of wood, just as the dust or borings will accumulate about the edge of a hole which a carpenter is boring.

I stood by and watched her work for ten or more minutes, when she suddenly stopped, withdrew her ovipositor and hopped away. Along the fence, within a distance of 30 feet, I found 15 other holes, 11 of which were fresh, while the others had evidently been bored the previous year. Most of these were on the upper edge of the top board, which was in all cases of pine and perfectly sound. None of the holes contained eggs, most of them being less than half-an-inch in depth.

On September 21st I found two ♀'s ovipositing in the sides of a rotten stump. Their abdomens were inserted their full length, and when removed eggs were found in the lower horizontal portion of each cavity.

CHLOEALTIS CURTIPENNIS, Harris. (C. E., XXIII., 76.)

This has proved to be a very abundant species among the tall grasse of the low, damp prairies of Northern Indiana.

*Rep. Conn. Board of Agric., 1872, 375.

†"Distribution of Insects in New Hampshire," 371.

Digitized by Google

PEZOTETTIX GRACILIS, Bruner. (C. E., XXIII., 81.)

Mature specimens have been taken as early as June 25th. By July 4th it is common, especially upon the iron weeds (*Vernonia fasciculata*, Mich.) which grow abundantly in low, open woods. It has been found in copulation at this date and as late as November 10th, though whether there is more than one brood each season, I have not been able to ascertain.

(To be continued.)

A LEAF-TISSUE GALL ON MOUNTAIN COTTONWOOD.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA.

A fleshy leaf-tissue gall was found on terminal twigs of *Populus Monilifera (?)* June 18, 1892, a few miles to the north of Ojo Caliente, in Southern Socorro county, New Mexico. This gall is somewhat similar in method of formation to one that has been found on *Rhus microphylla*, which possesses a cock's-comb-like appearance.

Gall.—Diameter (after being thoroughly dried and much shrunken) of four galls: 15 by 12 mm.; 17 by 19 by 14 mm.; 20 by 14 mm.; 22 by 20 by 18 mm.; the length (extent on stem) being less than width. Gall rather irregular in outline, fleshy, growing more or less in irregular sections, clustered together around the twig, but springing from side stems, consisting of a mass of fleshy, abnormally developed and degraded leaf-tissue massed together. Colour, red on all surface exposed to the sun; the lower or inner surface next the centre of the tree, when not so exposed, but sheltered by the foliage, greenish. The irregularity of the external surface of the gall is due to the various groups of massed leaf-tissue being independently and unequally developed, with spaces between.

Four galls. Two cast skins were found on the surface of these. The skins appear to be hemipterous, possibly homopterous. The fleshy sections of tissue contain cavities within, but there is no trace of the gall maker.

Digitized by Google

ON SOME NORTH AMERICAN SPECIES OF CHIONOBAS.

BY DR. HERMAN STRECKER, READING, PA.

Last December Mr. H. J. Elwes gave a revision of the genus Chionobas in Trans. Ent. Soc., London, to which Mr. W. H. Edwards, in the March number of the CAN. ENT., gives "notes," or rather exceptions, in which he still contends that *Gigas*, *Californica* and *Iduna* are three distinct species, but now allows *Nevadensis*, which he formerly considered also to be distinct, to be a synonym of one of these, but does not know of which. Elwes has placed these four as one species, just as they are in the "Synonymical Catalogue" issued by me in 1878, nor can I understand how anyone can imagine there is more than one species under the four names; there is absolutely no point by which any of the examples can be separated, whether they come from California, Washington, Oregon or elsewhere; were they to be mixed indiscriminately, without locality labels, no one could say from whence came this or that example, or which was this or that so-called species.

With *Subhyalina* Elwes has followed our Syn. Cat. in the same way, with the single exception, an important one, that he has given the name *Subhyalina* priority over *Crambis*, which it really has by right of publication, if the two names belong to the same insect, but the doubt surrounding the former name, which I believe belongs to an Erebia, influenced me in placing Freyer's name first. The description of *Hipparchia Subhyalina* in appendix to Ross's 2nd Voyage, evidently fits *Erebia Fasciata*, or a variety of it, and, as Edwards suggests, the example in Oberthür's collection submitted to Elwes may not be the type, as certainly, if it is the same species as Bean took in N. W. Territory, it in no wise agrees with Curtis's description.

Ch. Alberta, which Edwards insists is *Varuna*, is a smaller form of *Chryxus*, of which I have good examples, ♂ ♀, received from Morrison a number of years since, who took them in Idaho; Elwes's types came from Calgary; he says in the collection of a Mr. Wolley-Dod, from whom he obtained them, were also examples of *Varuna*. At the same time I received from Morrison *Alberta* ♂ ♀; he also sent *Varuna*, ♂ ♀, taken at same locality. There is no difficulty in distinguishing these two, as *Varuna* is a variety or form of *Uhleri*, whilst *Alberta* occupies the same position towards *Chryxus*. *Varuna* I also have from Bean, in N. W. Ty., and from Morrison, from Arizona. I have *Uhleri*, from Colorado, not to be distinguished from *Varuna*, from Idaho and Arizona. The female of

Digitized by Google

Alberta, which was unknown to Elwes, differs, as is usual in the genus, from the male, in the wings, being broader and more rounded; the colour is same as ♂; the outer edge of mesial band on under side of secondaries is markedly defined, but the whole space from that edge to the base of the wing is heavily striated. Of *Chryxus* I have examples from Utah of the pale yellowish colour of *Nevadensis*, which, on the upper surface, they so wonderfully resemble as to be almost mistaken for medium-sized examples of that species. There are yet fairly strong grounds for Elwes's first impression that *Ivallda* was a variety of *Chryxus*, as the only apparent difference worth noting is that of colour, but there is too little of *Ivallda* known to form any certain conclusion.

From Morrison I also received a ♀ Chionobas, taken by him at Mt. Graham, Arizona. The easiest way to describe this would be to say it is the counterpart of *Ch. Fulla*, Ev., from the Tarbagatai, a species but little known in American collections; this closely-allied American species, which we might designate as *Ch. Daura*, expands nearly 1¾ inches, is whitish ochraceous, almost the colour of *Ivallda*, the primaries finely striated on costa, a broad, submarginal band scarcely a shade paler than the part interior to it, from which it is separated by a brown line produced in an angle at 2nd discoidal nervure, from whence it recedes inwardly at the costa; in this band are three small black spots, in cells 2, 3 and 5 the uppermost one largest and minutely pupilled with white. A gray marginal band. Fringe from anal angle half way brown, rest brown and whitish alternately. Inferiors have a broad, pale, submarginal band, on which, in cell 2, is a minute black dot or point. The mesial band defined by a dark shade at edges. A gray marginal band. Fringe whitish, with brown at termination of veins. Reverse surface paler than above. Secondaries almost white, markings of upper surface reproduced. Primaries towards exterior margin delicately striated, the spot in cell 3 wanting. Inferiors most daintily mottled, much finer than in its Asiatic analogue or in any other American species. A broad mesial band very distinctly defined and shaded with dark brown at its edges. Towards the margin of the wing a tendency in the mottling to segregation. Fringes on all wings as above. I have only seen this one ♀ example, and on one example it is not to be known whether this be identical with the Central Asiatic species compared with it (to my examples of which its resemblance is amazing), which is possible, but scarcely probable, or whether it be distinct, which, as far as the American species are concerned, it certainly is, is one of those problems the future must solve.

Digitized by Google

Ch. Brucei, W. H. Edw., I cannot separate from *Bore*, at least not from the examples of the latter I have from Dr. Staudinger, who, as an authority on the Palæarctic fauna, has no peer.

Ch. Beanii, Elwes, will easily be known always by its almost uniform dark smoky hue, and will hold its own; *Assimilis*, with which Edwards confounds it, being only a synonym of *Crambis*, Frey.

The true *Ch. Semidea* I have in numbers from Okkak, Labrador, and they differ in nothing from the Mt. Washington ones, as neither do several in my possession from Hudson Strait. Those from Colorado (which Edwards claims are *Oeno*) in some instances, especially in the females, have a slightly more ochrey shade, and the secondaries beneath are not so darkly coloured in the moss-like mottling, but these are entirely too slight grounds to sustain any claims to specific distinctness. I possess three distinct species from Labrador, viz., *Semidea*, *Crambis* and *Taygete*, and the two first are as easily separable from each other as from the last.

As to the value of the clasper depended upon by Mr. Elwes in associating species, I certainly have no "practical experience in the matter," having never given it much attention, hence can offer no opinion, though from what I have noted of other instances of sexual peculiarities they sometimes would unite species otherwise by no means close.

NOTES ON SOME OF THE NOCTUÆ IN THE BRITISH MUSEUM COLLECTION.

BY J. W. TUTT, F. E. S. (EDITOR OF "THE ENTOMOLOGIST'S RECORD"), LONDON, ENGLAND.

Some remarks made by Mr. Grote in his "Note on *Acronycta cristifera*" lead me to support his contention that in the British Museum "types may have become misplaced." I am, of course, simply a specialist at European NOCTUÆ, and only such material from outside countries as helps my work (more especially with the British species) has any great interest for me, and only so far as this can any remarks that I make be considered of value.

In writing my *British Noctuæ and their Varieties*, I was obliged to refer continually to the British Museum material. The NOCTUÆ had then just been re-arranged by Mr. Butler, and it had been re-arranged in the very tip-top of museum methods. The great Zeller collection had been incorporated, Mr. Grote's collection ditto, and the result no one can imagine. I maintain that collections of this kind have an inherent value

Digitized by Google

in themselves, and that as soon as they are broken up no man can for a moment what the original possessor intended, whereas if we can see the collection as a master left it, we can understand at a glance what he intended.

To illustrate my point. In lumping the various collections together the most ridiculous errors have been made, even with the commonest British species. We have a common British species, very common indeed within two or three miles of the British Museum, *Hadena thalassina*. This species every youngster here gets his first season. In the Museum collection, as arranged by Mr. Butler, it consists of eight *Hadena (Mamestra) thalassina*, two of *H. adusta* and four of *H. genistæ;* the last specimen of *N. margaritacea* is a typical *N. glareosa;* the two last specimens under the name of *N. punicea* are specimens of *N. umbrosa*. Four specimens of *Agrotis nigricans*, var. *carbonea*, are placed in the series of *A. tritici*. A very fine series of the grey type of *Agrotis* (*Pachnobia*) *hyperborea* is in the Museum under its true name, but the "types" of its red British variety, *carnica*, are placed right away in another drawer, mixed up with another species, *P. carnea*. Struck, apparently, by the similarity of the names—*carnea* and *carnica*—the two red specimens of a distinct species have been put into the series of another species which has no affinities with the first. So much for some of the errors of lumping, which I can vouch for.

Now, there is another little matter which should interest American entomologists, and which, I am sorry to say, puts Mr. Butler's inability to see even the most striking specific characters in a strange light. It refers to *Leucania* (*Heliophila*) *pallens* and *L. straminea*. Mr. Butler writes: "*L. pallens*, of the United States, agrees absolutely with the European *L. straminea*. The two forms have practically the same characters, and, if received from any extra European locality, would never have been considered distinct; indeed, it is possible to find examples which cannot with certainty be referred to one form rather than the other. *L. straminea* differs chiefly in the generally more prominent pale longitudinal streak above the median vein of the primaries, and the better-defined black or dark markings. Not having bred both from the egg, I have kept them separate in the collection." (Trans. Ent. Soc, London, 1890, pp. 660–661). A reference to the British Museum material, on which the remark was based, shows that they have *not* been kept separate, and of a whole row thus named by Butler, only seven specimens are *straminea*, and not one

Digitized by Google

Ch. B[illegible] The two species are much more distinct from [illegible] and *V. Atalanta*, and I cannot imagine even the aut[illegible] naturalist, considering them identical, and still less [illegible] that the only reason for making them separate is that they do [illegible]me from extra European localities" (what a condition the extra-[illegible]ópean species in the British Museum cabinets, as recently re-arranged, must be in, if named on these lines, I must leave the "extra-European" naturalists to imagine!) whilst it is to be noted that the only differences which Mr. Butler sees are "the generally more prominent pale longitudinal streak above the median vein of the primaries" and "the better-defined black markings," when, as a matter of fact, it is difficult to find a point of similarity,—the thoracic crest in *straminea*, the differently shaped wings, the sexual variation in the hind wings, development of the pale nervures, etc., all pointing to complete distinctness, and all this muddle about two species which swarm on the Thames' marshes in the south-east district of London, only a few miles, as the crow flies, from the British Museum, and which have different larvæ feeding at different times in different ways on different food-plants.

I cannot say how extremely sorry I was to find this condition of affairs in our National Museum, but it is a most serious matter, and the condition of the collections in the British Museum is a matter for the consideration of scientific men all over the world.

Two things I would ask American entomologists to do. (1) To take nothing published on the NOCTUÆ in the British Museum for granted, and to be sure to verify each individual statement. (2) To insist, in season and out of season, that collections left by eminent men shall be left intact, so that specialists may form their own conclusions. The lumping process, which results in the production of such a condition of affairs as I have pointed out at length in the Introduction to Vol. IV. of my *British Noctuæ and their Varieties*, is a matter for the consideration of every scientific man.

Digitized by Google

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

III. The Melolonthine Scarabæidæ of Ontario and Quebec.

The members of this group are distinguished, as already stated, by the position of the abdominal spiracles, which are placed in part on the superior portion of the ventral segments, the rows feebly diverging; the last spiracle usually visible behind the elytra. Secondary sexual characters are displayed often in the antennæ, the club being longer in the males; the legs and ventral segments also often give us a clue to the sex of the specimen, as will be shown in the proper place. The following partially artificial key will enable the genera to be properly identified so far as the recorded species are concerned.

A. Middle and hind tibiæ with only one spur, which is sometimes obsolete. No onychium, body scaly..... *Hoplia.*

AA. Middle and hind tibiæ with two spurs, onychium well developed.

b. Form elongate, slender; colours metallic green or bronze (at least in part) or yellow.

Elytra not densely scaly; claws chelate..... *Dichelonycha.*

Elytra densely covered with ochreous scales; claws not chelate ..... *Macrodactylus.*

bb. Form robust, heavy; colour brownish, sometimes iridescent, pubescent, or somewhat irrorated.

c. Ventral segments five. Elytra either uniformly rather finely punctured or with punctured striæ..... *Diplotaxis.*

cc. Ventral segments six.

d. Elytra with rather indistinct but regular sulci or grooves on the disk. Size small..... *Serica.*

dd. Elytra without striæ or sulcations over the greater portion of the disk. Size larger.

Antennæ with the third joint not elongate, the club three-jointed..... *Lachnosterna.*

Antennæ with the third joint greatly elongate, the club three-jointed ..... *Polyphylla.*

In using the above table care must be taken to count *all* of the ventral segments—the first or last is in danger sometimes of being overlooked. A reference to the specific characters, as given in the following synopsis, however, will aid inexperienced workers in clearing up possible doubts.

Digitized by Google

It is perhaps unnecessary to mention that a fairly good lens should always be at hand to aid the eye in discriminating the more difficult species.

HOPLIA, Ill.

These are oblong insects, more or less flattened above, and covered either entirely or in part with scales, ordinarily yellowish, brownish, greenish or of metallic lustre. The claws are chelate. The two sexes often differ in size and colour, and the males have thicker hind tibiæ and tarsi. They are found on flowers during the day. Following the scheme of Dr. Leconte, the Canadian species may be thus distinguished:

A. Claws of hind tarsi not cleft.

Prothorax wide, narrowed in front, sides subangulate and rounded. Sexes dissimilar in colour; the ♂ black, hairy, with cinereous pubescence, sprinkled beneath with silvery scales; ♀ brown, very densely clothed with pale brown and yellowish silvery scales.....*trifasciata*, Say.

Prothorax wider in front of the base, sides strongly angulated. Sexes similar, clothed with oval ochreous scales...*mucorea*, Germ.

AA. Claws of hind tarsi cleft near the tip; sides of prothorax broadly rounded, front and middle tarsi with two claws. .....*modesta*, Hald.

The *Hoplia tristis* of the Society list is the male of *trifasciata* according to Dr. Leconte.

DICHELONYCHA, Kirby.

Elongate beetles, usually piceous or testaceous in colour, often with a distinct green or bronze lustre, found on young shoots or the leaves of trees. The claws are chelate (*i.e.*, capable of being folded along the tarsi). The male has the club of the antenna nearly as long as the funiculus, and the outline of the middle line of the abdomen is concave when viewed in profile. The table as given below will assist in identification:

A. Thorax without median groove, but sometimes with a line.

b. Legs almost entirely black.....*Backii*, Kirby.

bb. Front and middle legs testaceous, tip of hind tibiæ and the hind tarsi piceous.....*elongata*, Fab.

bbb. Legs entirely testaceous.

c. Anterior tibiæ with the upper tooth obsolete, *Canadensis*, Horn.

cc. Anterior tibiæ tridentate.

Median line of thorax faint, punctures coarser .....*subvittata*, Lec.

Digitized by Google

Median line of thorax wanting, punctures finer.....*testacea*, Kirby.

AA. Thorax with deep median groove, disk punctured in an even space each side.....*albicollis*, Burm.

MACRODACTYLUS, Latr.

The "Rose-bug," *M. subspinosus* (Fig. 25), is the only recorded Canadian species of this genus, and is probably too well known to need an extended description. It is an elongate insect (about .35 inch) with very long and slender legs, the body covered with ochreous scales to the extent of obscuring the real colour. The thorax is very long and angulate on the sides.

Fig. 25.

SERICA, MacLeay.

Two species are recorded from East Canada. They are robust convex insects of rather small size (.35 to .42 inch), broader behind, giving them a very characteristic appearance. The species fly chiefly in the evening, and during the day may be found under leaves in the woods. They are easily separated thus:

Body not iridescent, clypeus with a small acute incisure each side.....*vespertina*, Gyll.

Body iridescent, clypeus without incisure.....*sericea*, Ill.

DIPLOTAXIS, Kirby.

These beetles are easily known from *Serica*, to which they bear some resemblance, by the elytra not being sulcate, but either simply punctate or with the punctures arranged in rows, the rows in pairs. The wider interspaces are irregularly punctured; the body is less convex and less dilated posteriorly than in Serica. The species of the region under consideration may thus be known:

A. Body pubescent, elytra without distinct rows of punctures..*sordida*, Say.

AA. Body not pubescent above, elytra distinctly punctate-striate.

Thorax with scattered punctures, leaving smooth spaces near the middle.....*liberta*, Germ.

Thorax densely and more finely punctured .....*tristis*, Kirby.

LACHNOSTERNA, Hope.

This genus, formerly in confusion in all cabinets, has lately had the attention of Dr. Horn, who has developed characters that may be

Digitized by Google

used with profit in synoptic tables, and thus rendered the task of identification much less difficult, though from the extent of the group there is necessarily still trouble in certain portions of the series. In the following table I have used chiefly the points first recognized as important either by him or by Dr. Leconte, but by a somewhat different, if more artificial, sequence, am able to do away with the necessity of using the fixity or freedom of tibial spurs of the male as a prime character, this being somewhat difficult for a beginner to demonstrate without softening the specimen. The ventral ridge referred to as separating the forms of the *fusca* group is to be found near the hind margin of the ventral segment immediately preceding the last.

Though the species of *Lachnosterna* are ordinarily easily separated from those of any other Eastern American genera by their facies (Fig. 20, page 197, *Lachnosterna fusca*) their extreme similarity amongst themselves is such as to practically debar the formation of a table based on easily seen characters, and the females must usually be associated with their appropriate males by comparison. They have been almost entirely left out of account in the second division (AA) of the accompanying table:

A. Body above conspicuously hairy or pubescent.

b. Antennæ 9-jointed; body above sparsely clothed with erect hairs..... *hirsuta*, Knoch.

bb. Antennæ 10-jointed.

Elytra with series of erect hairs arranged in vittæ..... *hirticula*, Knoch.

Elytra with sparse short pubescence, longer at base..... *tristis*, Fabr.

Elytra pruinose, pubescence uniform, recumbent. *ilicis*, Knoch.

AA. Body without conspicuous hairs or pubescence above.

c. Inner spur of hind tibiæ ♂ very short, the outer long and slender..... *ephilida*, Say.

cc. Inner spur of hind tibiæ ♂ at least moderately long (usually half as long as the other or more).

d. Yellowish-testaceous, form slender, subcylindrical, size small (.41 to .52 inch.)..... *gracilis*, Burm.

dd. Colour darker, form more robust, never notably slender, size larger.

Digitized by Google

Fig. 26.

e. Inner spur of ♂ hind tibiæ arcuate and angularly bent at tip, somewhat sigmoid in form (see fig. 26).....*gibbosa*, Burm.

ee. Inner spur of ♂ hind tibiæ at most slightly curved.

f. Antennæ 9-jointed.

g. Sutural stria well impressed, the costa of normal convexity.

Form oblong-oval, last ventral of ♂ convex, sometimes with a median channel.....*implicita*, Horn.

Form elongate, last ventral of ♂ broadly concave with longitudinal median impression.....*villifrons*, Lec.

gg. Sutural stria indistinct, costa scarcely elevated.....*limula*, Horn.

ff. Antennæ 10-jointed.

h. Clypeus moderately closely punctate only, the sides of the thorax entire, disk never very coarsely punctate.

Ventral ridge of ♂ long, arcuate, overhanging for its full length behind.....*dubia*, Smith.

Ventral ridge of ♂ longer, slightly curved, the ends only overhanging behind.....*fusca*, Fröh.

Ventral ridge of ♂ nearly straight, not overhanging behind.....*grandis*, Smith.

hh. Clypeus densely punctate.

i. Thorax broadest at base, margin entire or slightly crenate, disk variably punctured.

Last ventral of ♂ vaguely longitudinally impressed.....*marginalis*, Lec.

Last ventral of ♂ with cupuliform fovea..*fraterna*, Harr.

Digitized by Google

ii. Thorax widest at middle, margin distinctly crenate, disk coarsely punctate.

Punctures of thorax regularly placed. . . *profunda*, Blanch.

Punctures of thorax irregularly placed, the median line and often lateral spaces smooth .... *rugosa*, Mels.

Of the species above given, *grandis* is reported (in Canada) only from Nova Scotia, and *limula* from "south of Hudson's Bay." A few of the others are simply recorded from "Canada" without more definite locality; but as they occur in the adjacent United States, they are in all probability to be met with in the provinces under consideration. The *cognata* of the Society's list is simply a variety of *fraterna*, in which the thoracic punctures are equal in size and the margin irregular; *subtonsa* is a synonmy of *ilicis*, according to Dr. Horn.

Fig. 27.

POLYPHYLLA, Harr.

The only form found in East Canada is *P. variolosa*, Hentz (Fig. 27), a very fine, large insect, nearly or quite an inch in length. The form is something like that of *Lachnosterna*, but the upper surface is marked with three white vittæ on the thorax and indistinct lines and spots on the elytra, of whitish scales. The antenna of the ♂ is furnished with a very long club.

OBITUARY.

Died, in New York City, 21st April, 1894, Mrs. Julia Perkins Ballard, wife of Prof. Addison Ballard, now of New York University, but for many years of Lehigh University. It was at Easton, Pa., that Mrs. Ballard became interested in entomology, and her personal experiences were published in the little volume, "Insect Lives, or Born in Prison," later revised and much enlarged, under the name of "Among the Moths and Butterflies," Putnams, 1890. Mrs. Ballard was enthusiastic in her studies, and her charming books have done much to foster a love of natural history among the young people. W. H. E.

Digitized by Google

NEW CYNIPIDÆ.

BY C. P. GILLETTE, FORT COLLINS, COLORADO.

(Continued from page 159.)

CYNIPS, Linn.

C. washingtonensis, n. sp.

Galls of this species were sent me by Mr. Trevor Kincaid, of Olympia, Washington, who writes that they were collected from the twigs of *Quercus garryana*. The galls are ellipsoids, from 5 to 7 mm. in greatest diameter; they are smooth, monothalamous and snuff coloured, both externally and internally, and are attached by a small projection to the side of small twigs. A few specimens that appear not to be mature are greenish in colour, and have shrivelled somewhat on drying, so that the surface is covered with small, shrunken areas. The substance of the gall is uniformly and densely cellular. Described from 13 galls.

Gall-fly.—General colour a dark brown, inclined to black. *Head* small, blackish in colour, tinged with rufous; antennæ of the same colour as the head, 14-jointed, 3rd joint once and a-half as long as the 4th. *Thorax* finely rugose and rather coarsely punctured, parapsidal and median grooves distinct near the scutellum, the former extending half way to the collar, the latter less than half way. The two parallel lines extending back from the collar and the lines over the bases of the wings are the blackest parts of the mesothorax. Scutellum rugose, foveæ scarcely discernable; pleuræ finely punctured, the punctures giving rise to hairs; colour of pleuræ rufous. *Abdomen*, except a large patch on the dorsum of the 2nd segment and a narrow line over the succeeding segments, densely set with silky pubescence, the hairs rising from minute punctures. *Wings* hyaline, 5 mm. long, nervures slender, radial area long and narrow. *Feet* of a light chestnut colour, the tarsi being darkest, densely set with a fine pubescence. Length, 4 mm.

Described from one bred female.

ANDRICUS, Hartig.

A. spongiola, n. sp.

Galls of this species were also sent me by Mr. Kincaid, who writes that he took them from limbs of *Q. garryana*. They are polythalamous, globular, buff-coloured galls measuring from 3 to 5½ cm. in diameter; some of the galls are tinged with salmon. The galls grow in clusters on the limbs, and are in some cases much pressed out of shape. Perfectly

Digitized by Google

shaped galls resemble the galls of *Amphibolips spongifica*. Internally the galls are composed of an exceedingly brittle, structureless material, of a whitish or buffy-white colour that, to all appearances, shrinks away as the gall dries, so that there are large open spaces internally. Near the point of attachment on the inside of the gall is more or less of a resinous substance. The portion containing the larval cells, which are few in number, sometimes only one, is more dense, almost woody, in structure. The substance of these galls cuts about like a perfectly dry cracker.

This gall is separated readily from Mr. Bassett's *A. californicus* by the much less dense internal structure, in which are large open spaces.

Gall-flies.—The flies are of a very uniform walnut-brown colour throughout. So far as I can see, this colour alone separates the species from Bassett's *californicus*, which is very much lighter, a good cinnamon-brown. (These colours are given in accordance with Ridgway's Nomenclature of colours.) *Head:* Face finely rugose, more coarsely so near the mouth; vertex, genæ and occiput very finely rugose or granular in appearance, face rather closely set with very fine pubescence, occiput black, antennæ 15-jointed, 3rd joint 1½ times as long as the 4th, joints beyond the 4th gradually shorter, last 7 or 8 joints quite short and thicker than the preceding. *Thorax* very finely rugose and covered with pilose punctures, parapsidal grooves narrow and extending about half-way to the collar, median groove wanting; a slight groove on either side runs forward over the base of the wings; the two parallel lines from the collar are very distinct and extend fully half-way to the scutellum. Scutellum with two small foveæ fluted at the bottom, finely rugose, covered with a fine pubescence; pleuræ finely punctured and hairy. *Abdomen* polished, sides of 2nd segment near its base hairy, all the segments very minutely punctured. *Wings* slightly smoky, venation normal. *Feet* unicolorous with other parts, tarsal claws bidentate.

Length, 5 mm. Wings, 6 mm.

Described from 15 bred females. Galls were received August 26th, and the flies emerged between the 3rd and 22nd of November.

HOLCASPIS, Mayr.

H. maculipennis, n. sp.

The fragments of a globular leaf gall, about 1½ cm. in diameter, composed of a thin outer shell and a single larval cell held in place by radiating fibres, was sent me some time since by Prof. T. D. A. Cockerell,

Digitized by Google

who writes me that the gall was taken on the west slope of the Organ Mountains, in N. M., from a leaf of *Q. wrightii.*

Gall-fly.—A single female fly, in perfect condition, accompanied the gall, and may be described as follows :

Colour, rufous and black. *Head*, genæ, orbits, vertex and bases of mandibles rufous ; middle of face, occiput and tips of mandibles black ; face finely rugose, punctured and sparsely haired, the hairs rising from the punctures ; vertex and genæ more finely rugose or granular in appearance, palpi yellowish, antennæ rufous, 14-jointed, 3rd joint and last three joints blackish, 3rd joint distinctly longer than the 4th. *Thorax :* Prothorax rufous and finely rugose, mesothorax above blackish, streaked with rufous along the parapsidal grooves and along the lateral margins over the bases of the wings, otherwise black. The surface is finely rugose and set with punctures, moderately hairy, parapsidal grooves entire and very distinct, but not broad, median groove absent, the polished parallel lines extending back from the collar, and those outside the parapsidal grooves over the bases of the wings conspicuous ; scutellum rugose, rufous, except at base, where it is black, with shining basal groove crossed by numerous raised lines ; mesopleuræ rufous above and below, but black on median portion, punctured and moderately hairy. *Abdomen* black and shining, venter somewhat rufous, posterior margin of segments very oblique, sides of 2nd segment near base hairy. *Wings* long, nervures black, cells containing numerous black spots. This beautiful maculation of the wings, unlike any other species with which I am familiar, suggested the specific name for the species. *Feet* dark rufous, femora blackish, rather hairy.

Length, 3 mm. Wings, 4 mm.

DRYOPHANTA, Först.

D. glabra, n. sp.

Galls of this species were found abundant by the writer on leaves of *Quercus undulata* at Manitou, Colo., Sep. 30th, 1892. The fresh galls are straw-coloured, becoming brown with exposure. They are semi-globular, flattened on the side next the leaf, from 4 to 6 mm. in diameter, and situated along the midrib of a leaf, on either surface, but mostly below. A single larval cell in each lies next the leaf, and from it a mass of delicate fibres radiate to the outer shell, which is rather firm. The inner surface of this shell, in galls that have been protected from the weather, is of a deep pink colour. A number of the galls usually occur on the same leaf, and sometimes crowd one another, so they are far from globular.

Digitized by Google

Gall-fly.—With the exception of a little rufous on the joints of the feet and on the base of the mandibles, the colour is deep black. *Head* finely rugose, face with two parallel grooves and median ridge, antennæ 14-jointed, 3rd joint as long as 1st and 2nd or 4th and 5th united; ocelli well separated and inconspicuous. *Thorax* glabrous above, parapsidal grooves very distinct and extending to the collar, scutellum rugose, with basal groove, mesopleuræ smooth and glabrous beneath the wings. *Abdomen* shining, black, without sculpturing, the posterior margin of the 2nd segment quite oblique. *Wings* long, hyaline, beautifully iridescent, nervures slender. *Feet* black, tibiæ set with a very fine gray pile. Length, 2½ mm. Wings, 4 mm.

Described from one bred female.

(To be continued.)

CORRESPONDENCE.

LITHOPHANE ORIUNDA.

Sir,—Two localities may be mentioned additional to those given by Mr. Moffat in July (1893) number.

Mr. Grote has recorded Wisconsin as a habitat of *Oriunda*, and I can say that a single specimen was collected at Galena, Illinois, Sept. 26, 1875, from a sugared tree. THOMAS E. BEAN, Laggan, Alberta.

Sir,—I wish, on behalf of the Entomological Society of Ontario, to acknowlede the receipt of a contribution to the Society's collection of native Coleoptera, from Mr. A. H. Kilman, of Ridgeway. It consists of over a hundred and fifty species that were wanting in the Society's cabinets, all nicely mounted and in fine condition.

London, May 16th, 1894. J. ALSTON MOFFAT, Curator.

IS CŒNONYMPHA TYPHON SYNONYMOUS WITH C. INORNATA?

Sir,—Will American entomologists who are acquainted with the European forms of *Cœnonympha typhon*, especially with vars. *laidion*, Bork, and *isis*, Tett (probably identical), inform me whether *Cœnonympha inornata*, Edw., is a distinct species or is identical with these varieties? From the descriptions, I incline to the latter view, but an inspection of some specimens of the American insect in the British Museum (Natural History), not very first-rate ones by the way, rather lends countenance to the former. F. I. BUCKELL, M. B., 32 Canonbury Square, London N, England.

Digitized by Google

GLASS TUBES AS INCUBATORS.

Sir,—On June the 24th, 1893, I was obliged to go to my home in the High Sierras and beyond the Yosemite 22½ miles, as I had some moth eggs that I wanted to hatch and rear larvæ from. Before going I placed all the leaves that had eggs on them in a small glass jelly jar; being three days getting there, on account of the deep snow, I kept putting in fresh leaves every day for the young larvæ to feed on, as the eggs had begun to hatch before I started, and when I got home I had more dried and withered leaves than I bargained for, and in consequence lost some of the smaller larvæ that had hidden themselves. To prevent a recurrence of such loss, I thought of some glass tubes that were sent to me by Prof. Riley. I then separated all the leaves that had eggs on them, cut away all the superfluous dry parts of the leaf, and placed them all in one of these tubes, introducing a fresh leaf or part of one until a newly hatched larva made its appearance; I would then draw him out with the leaf and place him in another tube, or on a potted plant, thus ensuring correct data and better chances of observing its natural life-habits. This also ensures saftey to both eggs and the young larvæ, as new food can be introduced and the old extracted without annoying the larvæ.

JOHN B. LEMBERT, Yosemite, Cal.

THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

The Association of Economic Entomologists will hold its annual meeting this year in Brooklyn, N. Y., August 14th and 15th, dates immediately preceding the meeting of the American Association for the Advancement of Science.

The fact that the meeting is to be held in Brooklyn is a sufficient guarantee of a large attendance and a meeting of more than usual interest. It is sincerely hoped that every member who can will be present, with papers to read, questions to ask and ideas to impart, that will make the meeting profitable and send all back to their posts of duty inspired to better work. C. P. GILLETTE, Sec'y., Fort Collins, Colo.

Digitized by Google

ASSEMBLING OF ATTACUS PROMETHEA.

Sir,—About 3 o'clock p.m., on the 11th of June, whilst hunting along the east side of a high picket fence, running north and south, with woods on the west, and a field on the east, my attention was arrested by the unusual movements of what I thought was a black butterfly. It was fluttering up and down the tall pickets, passing through between them and returning again, in a state of evident excitement. It left off, and flew close by me, when I saw that it was a male *promethea*. Meanwhile another had taken its place, and was going through similar movements. I at once inferred that a female must be in that vicinity. I moved onward, looking between the pickets, and I saw a female suspended to the lower end of a cocoon, out of which she had probably emerged that day. The cocoon was attached to the end of a slender twig, 12 or 14 inches from the fence, and about 4 feet from the ground.

I remained close by and watched the movements. There were at least four males on the wing. They would fly 20 or 30 feet along the fence, either way, and return. They never flew far afield, and I did not see that they ever entered the woods, whilst one or other of them was always fluttering about the spot, regardless of my presence. They seemed to tire themselves out in a main effort to locate the object of their search. I had watched for about fifteen minutes, when one came quietly along, passed between the pickets, fluttered hither and thither for an instant, then I saw its mate was found. During my observation the female was perfectly quiescent; not a movement of wing or foot. There were three males still on the wing when I left.

Are we to consider *A. promethea* a day flyer? or are all the Suturniidæ ready to pair at any hour of the twenty-four when circumstances are favourable? It seems they do not require to fly at all to feed. The female may oviposit during the night.

I was greatly impressed during the observation by noticing how little, if at all, eye-sight was made use of. J. ALSTON MOFFAT.

Mailed August 1st.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, SEPTEMBER, 1894. No. 9.

SOME INDIANA ACRIDIDÆ.—III.

BY W. S. BLATCHLEY, TERRE HAUTE, INDIANA.

(Contnued from page 223.)

Among the species of Pezotettix occuring in Indiana, there is one which I have never been able to place satisfactorily to myself. In my first paper on Indiana Acrididæ I called it *P. rotundipennis*, Scudder, upon the authority of Mr. S. H. Scudder, to whom specimens had been sent: Afterwards other specimens were sent to Prof. Lawrence Bruner, of Lincoln, Nebraska. He referred them doubtfully to *P. unicolor*, Thomas, stating that he had never seen *unicolor*, but that in his opinion they were not *rotundipennis*, as they differed materially from authenticated specimens of that locust in his collections from Florida.

I then let the matter rest for three years, when, finding no description agreeing with the insect, and having received nothing like it in exchange, I sent a number of specimens to Mr. A. P. Morse, of Wellesley, Mass., who carefully compared them with Mr. Scudder's types of *rotundipennis*, and pronounced them different. Mr. Scudder, after a second and more careful comparison, also pronounces them different. That they are not *unicolor* anyone who will carefully compare them with Thomas's description (Syn. Acrid., 151) or with the figure of that species (Pl. XLIV. Orth. of Wheeler Survey, 1875) will readily ascertain.

Taking the above facts into consideration, I believe the species to be new to science, and describe it herewith as follows :

PEZOTETTIX OBOVATIPENNIS sp. nov.

Pezotettix rotundipennis, Scudder, Blatchley, Can. Ent., XXIII., 1891, 80.

A Pezotettix, the ♂ of which is below the medium in size ; the ♀ much larger, and quite robust. The tegmina are shorter than the pronotum, obovate in outline, a little longer than their greatest breadth, and reach but little beyond the first abdominal ring. In the ♀ they are separated

Digitized by Google

from each other on the dorsum by a space equal to three-fourths their greatest width; proportionally nearer in the ♂. Wings represented by a slender, oblong scale, which does not reach the tympanum.

Pronotum with both anterior and posterior margins subtruncate; the sides of the posterior lobe finely and densely punctate. The disk in ♂ with the lateral margins slightly divergent only on posterior half; in ♀ obviously divergent throughout their entire length, so that the posterior margin of disk is one-third wider than the anterior. Median carina distinct and equal throughout, the lateral carinæ present but indistinct, especially on the posterior lobe. Occiput, tumid, prominent. Vertex between the eyes broader than basal joint of antennæ in ♀, of equal breadth in ♂; the margins somewhat elevated above the slightly depressed centre and continuous with the margins of the frontal costa; the latter not sulcate in the ♀, slightly so above ocellus in ♂. Eyes prominent. Cerci of ♂ oblong, the basal third slightly broader than apical third, the middle narrower; the apical half but little curved inward, and but slightly excavated on its exterior face. The hind femora shorter than abdomen in ♀.

Colour of dried specimens: Above, dull grayish-brown or tan. A shining black band starts from the middle of posterior margin of each eye, and passes back, covering the upper half of lateral lobe of pronotum, then narrows and curves downward to coxa of middle leg. Below, this is bordered by an ivory-white band, which extends back from cheek and covers lower half of lateral lobe of pronotum, and then curves down between the front and middle coxa. The metapleurite is also ivory-white. Below, the general colour is a dirty yellowish-brown, with the lower face of the femora orange-yellow. The hind femora with their apices black, and with two indistinct blackish bars on the upper and outer faces. Hind tibiæ olive-green, annulate with whitish near the base, the spines black. Antennæ with the basal half reddish-brown, the apical half fuscous.

Measurements: Length of body, ♂, 16 mm., ♀, 24 mm.; of antennæ, ♂, 9 mm., ♀, 9.5 mm.; of tegmina, ♂, 2.7 mm., ♀, 4 mm.; of hind femora, ♂, 10 mm., ♀, 12.5 mm.; of hind tibiæ, ♂, 9 mm., ♀, 10.5 mm.

According to Morse, the following are the chief differences between *obovatipennis* and Mr. Scudder's *rotundipennis*: The hind femora of the latter are much stouter, and the sides of pronotum more divergent. The anal cerci of *obovatipennis* are flatter, more erect, and more nearly equal in breadth and thickness throughout. The width of supra-anal plate,

Digitized by Google

instead of being equal to the length, as in *rotundipennis*, is much narrower than the length. The greatest difference, however, is seen in the marginal apophyses of the segment preceding the anal plate. In *obovatipennis* these are arched, divergent, tapering, and of considerable length, with a deep and narrow notch on each side at base; while in *rotundipennis* they are fully developed as slight flattened triangular projections, shorter than broad, and with the base not notched.

No description is extant of the ♂ of *P. unicolor*, Thomas. The following characters, from the description of the ♀, will show that it is distinct from *obovatipennis*:

"Sides of pronotum parallel; carinæ equally distinct. Elytra half as long as abdomen, oblong-ovate. Hind femora passing the abdomen slightly. Colour, reddish brown throughout."

In general appearance *obovatipennis* resembles somewhat *Pez. manca*, Smith, but the ♀ of the former is much larger and more robust, with the disk of pronotum flatter, the sides more divergent, and the vertex broader. The tegmina are shorter, and with a much narrower base than those of *manca*, while the two species differ materially in colour.

Obovatipennis has been taken only in Vigo and Monroe counties. It reaches maturity about September 1st, and frequents, for the most part, high, dry, open woods, especially those in which beech and oak trees predominate. On the tops of the hills, in the coal district of Vigo Co., where the soil is a clay, and the herbaceous vegetation somewhat limited, it is the prevailing, and often only, representative of the family. In late October, if the season is dry, it is often found in company with *Chrysochraon viridis* and *Truxalis brevicornis* among the reeds and tall, rank grasses near the border of marshes, and as late as November 22nd has been noted enjoying the afternoon sunshine from a perch on the bottom plank or rail of a fence. The ♀'s are always much more numerous than the ♂'s, the ratio being about 8 to 1. Their larger, robust form renders them more clumsy, and hence more readily caught by the hand, the ♂'s being active leapers, and requiring quick movement on the part of the collector to effect their capture.

PEZOTETTIX OCCIDENTALIS, Bruner. (C. E., XXIII., 81.)

This is the *Pez. viola* of my first paper. When that was prepared, I considered *P. viola* and *P. occidentalis* as synonyms, but having received typical examples of the former from Prof. McNeill, I find them to be distinct.

Digitized by Google

Occidentalis is probably the least common species of the genus in the State, its general range being more western.

PAROXYA ATLANTICA, Scudder.

Paroxya atlantica, Scudder, Proc. Bost. Soc. Nat. Hist., XIX., 29.

My *Pezotettix hoosieri* (C. E., XXIV., 31) is doubtless a short-winged form of this species. Typical specimens of *atlantica* recently received from Mr. A. P. Morse differ only in being much duller in colour, and in having the tegmina reaching to end of abdomen. I have taken hundreds of the form *hoosieri* in this State, and in no one have the tegmina reached beyond the middle of abdomen, but wing length in orthoptera is a character of but little importance. In Mr. Scudder's original description of *atlantica*, the length of antennæ of ♂ is given as 10 mm., whereas, in the examples received from Mr. Morse, and in all taken in Indiana, they are fully 15 mm. in length.

I have found this species in but two localities in the State, viz. : about the margins of a large pond in Vigo County, and in a tamarack swamp in Fulton County. It is abundant in both places from August to October.

MELANOPLUS COLLINUS, Scudder. (C. E., XXIII., 99.)

For the past three years this has been a very common locust, reaching maturity in this vicinity about July 15th. Like the next species and *Pezotettix gracilis*, it delights to carry on its courtship among the leaves and branches of the iron weed, and hundreds may be taken there, many of them in copulation, as early as August 1st. While of about the same length, the females are much more robust than those of either *M. femur-rubrum* or *M. atlanis*, and the tegmina just reach the tip of or are a little shorter than the abdomen, instead of exceeding it as in those species. It doubtless occurs throughout Indiana, having been taken on the border of Lake Michigan, by Prof. Slick.

MELANOPLUS BIVITTATUS, Say. (C E., XXIII., 99.)

A common species in early summer, making its appearance about June 15th, and disappearing by mid-September.

Mr. Scudder considers *M. femoratus*, Burmeister, as distinct from this species, stating* that: "*bivittatus* has the hind tibiæ glaucous and yellow; in femoratus they are red; and the two species can be instantly distinguished by these peculiarities."

*Report Brit. N. A., Bound Survey, 1875, 343.

Digitized by Google

I have taken in Northern Indiana a glaucous-legged ♂ in copulation with a red-legged ♀, and also specimens in which the tibiæ were dark brown at base, greenish or glaucous in the middle, and red on the apical third. Specimens from New England, labeled *femoratus*, by Prof. Morse, differ in no wise from those from Indiana, called *bivittatus* by as able an authority as Prof. Lawrence Bruner. I am, therefore, constrained to believe that the two so called species are one and the same, Say's name having the priority.

MELANOPLUS GRISEUS, Thomas. (C. E., XXIV., 30.)

On September 24th, 1893, I found this locust to be quite common within the depths of a tamarack swamp in Fulton Co. While other *Acrididæ* were common up to the very border of the tamarack growth, this and two species of grouse locusts were the only ones found within this border. Several pairs were taken in coitu. It was not an active insect—usually, after one or two short leaps, squatting close to the earth, and seemingly depending upon the close similarity of its hues to the grayish lichens about it to avoid detection.

***

Other than the Tettiginæ, the earliest dates at which mature locusts have been taken in Vigo County are as follows:

Schistocerca americana, Drury, April 11th, 1893. Blown in by storm.*

Chortophaga viridifasciata, De Geer, Apr. 15th, 1894.

Arphia sulphurea, Fab., May 5, 1894.

Pezotettix viridulus, Walsh, May 11, 1894.

CANADIAN HYMENOPTERA—No. 6.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

This paper contains the descriptions of the remaining new species of Ichneumonidæ from Vancouver Island. For the generic determinations of Amorphota, Semiodes, Phobetes and Hypocryptus, representing genera not hitherto recognized in America, I am indebted to Mr. Ashmead.

Sub-family ICHNEUMONIDÆ.

TROGUS FLETCHERII, n. sp.

Female—Length, 14 mm. Black with brownish abdomen and ferruginous legs. Head black; face beneath antennæ, narrow orbits,

*See Psyche, June, 1893.

Digitized by Google

palpi and mandibles ferruginous; antennæ long, slender, brown above, the scape and basal half of flagellum beneath, ferruginous. Thorax black, coarsely punctured; two short lines on mesonotum; scutellum, posterior face of metathorax, tegulæ and sutures at base of wings, ferruginous; legs, including coxæ, entirely pale ferruginous, or rufo-testaceous; wings large, yellowish; nervures ferruginous, the costa darker. Abdomen as in *exesorius*, but more coarsely sculptured and of a brownish colour, the first segment and base of second a little paler.

Described from one of two ♀ specimens bred by Mr. Fletcher from the pupæ of a Vancouver Island papilio, and named after him in recognition of the fact that to his example and incentive I owe my interest in entomology.

Sub-family OPHIONINÆ.

ANGITIA AMERICANA, n. sp.

Female—Length, 6 mm. Black, with partly rufous legs. Head small, polished; face opaque, but scarcely sericeous; clypeus slightly swollen, with a small tubercle above; antennæ reaching to middle of abdomen, slender, filiform, 19-jointed, joints 3–5 gradually decreasing in length, remaining joints sub-equal, the apical joint flattened internally. Thorax longer than high; mesonotum and pleuræ polished, the former indistinctly punctulate; scutellum rather prominent; metathorax declivous, areolated and punctate, the central area fusiform and less coarsely sculptured; legs slender; base of all the coxæ, the trochanters and the tarsi piceous; femora and four anterior tibiæ rufous, the posterior tibiæ dusky; wings hyaline, iridescent; stigma sub-triangular and with the nervures brownish, areolet sub-pentagonal, the outer transverse nervure less distinct. Abdomen strongly compressed towards apex, piceous-black and highly polished; first segment long and slender, not expanded at tip, which is faintly sulcate, spiracles near apex; second and third segments long, the incisure almost invisible; remaining segments short and slightly retracted; ovipositor scarcely exserted.

Described from one ♀ specimen from Victoria, V. I. (Taylor.)

PYRACMON VANCOUVERENSIS, n. sp.

Female—Length, 10 mm. Black, legs and abdomen in part rufous. Head sub-quadrate, as wide as thorax, black, distinctly punctate; entire face below antennæ, interior orbits nearly to summit of eyes, cheeks below the eyes, mandibles except tips, palpi and scape of antennæ, yellow; a puncture at each upper angle of clypeus; antennæ long, slightly

Digitized by Google

swollen medially and attenuated apically. Thorax with rather coarse punctures; those of the pleuræ and pectus less closely placed, a conspicuous suboval polished spot beneath the insertion of wings; metathoracic areas well defined; legs rufous, including the coxæ, the anterior pair paler, with coxæ and trochanters yellow, the intermediate coxæ and trochanters also partly yellow; posterior tibiæ darker towards apex, and tarsi yellowish; wings hyaline, stigma and nervures dark brown; areolet triangular, the outer transverse nervure incomplete, only extending two-thirds the distance across the cell; if complete it would meet the second recurrent nervure; tegulæ pale. Abdomen rufous; the petiole, apex of segment three, and following segments above, black; ovipositor scarcely exserted.

Described from one ♀ specimen from Victoria, V. I. (Taylor.)

AMORPHOTA, n. sp.

A species referred to this genus is found in Mr. Taylor's collection, but it has been damaged, and the abdomen is now missing. It is therefore not advisable to describe the species until further material is received. There is a possibility of its having been described as a Limneria.

Sub-family TRYPHONINÆ.

SEMIODES SEMINIGER, n. sp.

Male—Length, 7.5 mm. Black, with legs and abdomen rufous. Head transverse, as wide as thorax, truncate posteriorly, rather coarsely punctured, a semi-circular carina below the antennæ; face and cheeks with yellowish pubescence; clypeus, mandibles, and scape beneath, rufous; antennæ nearly as long as body, moderately short at base and attenuated toward apex, about 30-jointed. Thorax entirely black, lobes of mesonotum distinct, the central more strongly punctured than the lateral; metathorax truncate posteriorly and strongly areolated; legs rather stout, the posterior femora slightly swollen; all bright rufous, including the coxæ; wings hyaline, tinged with yellowish, the nervures brownish, the areolet small, sub-pentagonal. Abdomen petiolate, entirely rufous except petiole; the first segment gradually expanded to apex, spiracles beyond the middle, two dorsal carinæ not reaching the apex; first segment and base of second sub-aciculated, the rest of abdomen polished and feebly punctulate.

Described from one ♂ specimen from Victoria, V.I. (Taylor.)

Digitized by Google

PHOBETES CANADENSIS, n. sp.

Female—Length, 7.5 mm. Mostly ferruginous. Head transverse, emarginate posteriorly, pale ferruginous; eyes black; a spot enclosing the ocelli, others at the base of antennæ and of the mandible, black; clypeus, mandibles, palpi and lower orbits yellowish; antennæ testaceous, nearly as long as body and rather stout, about 30-jointed. Thorax ferruginous, with the sutures more or less black; mesonotum rather prominent, indistinctly punctulate; scutellum convex; metathorax rounded posteriorly with a triangular central area enclosed by feeble carinæ; spiracles circular; legs rufous, all the tarsi paler; wings hyaline, tinged with yellowish, nervures brownish, no areolet. Abdomen broadly fusiform, ferruginous, the apical segments dusky; the first segment expanded beyond the spiracles, the dorsal carinæ almost obsolete; first and second segments sub-opaque, densely, finely punctulate; ovipositor scarcely exserted.

Described from one ♀ specimen from Victoria, V. I. (Taylor.)

HYPOCRYPTUS VANCOUVERENSIS, n. sp.

Male—Length, 6.5 mm. Black, with legs and middle of abdomen rufous. Head rather large, about twice as wide as long; vertex rounded and smooth, with fine punctuation; face below the antennæ with fine silvery pubescence; a spot on mandible and the palpi pale; antennæ stout, as long as head and thorax, black, with a yellow spot on scape beneath. Thorax entirely black; mesonotum closely, finely punctulate; pleuræ shining, indistinctly punctured; metathorax truncate posteriorly, strongly areolated and rugosely punctured; legs pale rufous, including coxæ; the four anterior trochanters yellowish; base of posterior coxæ, trochanters, tips of tibiæ and tarsi dusky; wings hyaline, nervures brownish, no areolet. Abdomen sub-petiolate, the first segment expanded posteriorly and with two sub-obsolete dorsal carinæ; segments one and two, with base of three, densely, opaquely punctulate; terminal segments polished and sparsely punctulate; first and apical segments black; two, three, four, except sides, and spot at base of five, rufous.

Described from one ♂ specimen from Victoria, V. I. (Taylor.)

Sub-family PIMPLINÆ.

EPHIALTES PACIFICUS, n. sp.

Female—Length, 20-25 mm., with ovipositor 40-50 mm. Black, legs rufous. Head polished; face with yellow pubescence, longer on clypeus;

Digitized by Google

palpi pale; antennæ slender, shorter than the abdomen. Thorax polished, with faint, sparse punctures on mesonotum and pectus; metathorax more coarsely punctate, feebly sulcate, the carinæ obsolete; tegulæ, with a brief line before, white; legs, including coxæ, rufous; posterior tibiæ and tarsi brownish; wings hyaline, iridescent, areolet sub-triangular. Abdomen slender, coarsely punctured; first segment carinate and sulcate only at base; segments 2-4 nearly twice as long as the first, which is shorter than fifth; apical third of segments 2-6 polished and transversely wrinkled; ovipositor rufous, twice as long as the abdomen; sheaths black, coarsely pubescent.

Male—Length, 8 mm. Differs from ♀ in being so much smaller and in having the legs somewhat paler. The anterior coxæ and trochanters, a spot on intermediate, and a small annulus at base of posterior tibiæ, white. Abdomen slender, segments of almost equal length.

Described from three ♀ and one ♂ specimens from Victoria, V. I. (Taylor.) The diminutive ♂ may belong to a different species, but it resembles this much more closely than it does any other species from British Columbia.

EPHIALTES VANCOUVERENSIS, n. sp.

Female—Length, 16 mm., with ovipositor 30 mm. Black, with rufous legs. Head finely punctulate; face sericeous, edge of clypeus and tips of mandibles rufous, palpi white; antennæ slender, 10 mm. long. Thorax finely sculptured; mesonotum finely, transversely rugulose, pleuræ densely punctate; lateral margin of prothorax yellow, with a highly polished groove above; metathorax closely punctured, feebly sulcate, carinæ obsolete; four anterior legs, including coxæ, yellowish; the intermediate with the femora and tibiæ externally rufous, and the tarsi brownish; posterior coxæ, trochanters and femora rufous, the tibiæ and tarsi black; wings hyaline, stigma and nervures black, areolet sub-triangular and subpetiolate. Abdomen finely sculptured and not tuberculate, except obsoletely on the basal segments; first slightly longer than second, not carinate or sulcate; three following segments of equal length, remaining segments gradually shorter and more finely punctulate; ovipositor as long as body, red, with black, finely pubescent, sheaths.

Described from one ♀ specimen from Victoria, V. I. (Taylor.)

Digitized by Google

ARENETRA PALLIPES, n. sp.

Male—Length, 10–12 mm. Black, with rufous legs. Head coarsely punctate; face and cheeks with very dense greyish pubescence; antennæ long and stout. Thorax more coarsely punctured, less pubescent, the pleuræ somewhat shining; all the coxæ and trochanters black, remainder of legs rufous, except posterior tibiæ, which are brownish; wings iridescent, sub-hyaline; stigma and nervures black. Abdomen finely sculptured, except the first segment, which is coarsely punctate at base and longitudinally aciculate at summit; lateral margins of segments 1–4 yellowish, apical margin of 2–6 narrowly white.

Described from five ♂ specimens from Victoria, V. I. (Taylor), dated February, March and April, 1886, and marked as "Very common, flying over garden at Cedar Hill."

COLEOPTERA TAKEN AT LAKE WORTH, FLORIDA.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Lake Worth is an elongated bay connected with the ocean, two and one-half miles from its northern end, and separated from it by a narrow elevated strip of land, varying in width from two hundred to nine hundred yards. Its length is about 20 miles, while in width it averages about thirteen hundred yards. The country adjacent to the west shore is largely in its primitive state—white sand overgrown with Saw Palmetto, scrub live oak and many other shrubs and vines, with occasionally some pines. The flora of the strip between the lake and the ocean is designated the semi-tropical forest by Mr. Schwarz, who has largely developed the coleopterous fauna of South-eastern Florida.

The part of the lake and the ocean beach where this collection was made is that north from the inlet in about lat. 25° 40', long. 80°, this part of the coast being the most eastern point of Florida, and almost touched by the Gulf stream. The collecting was done from February 18th to April 18th, a season of the year when most insects have disappeared in these warm regions, as is well known, just as they do at the north during the same months. Insects were, perhaps, scarcer than usual on account of the dryness of the season, there having been no rain from December till my departure, and the temperature by night mostly 70°, and that of midday 84°.

Digitized by Google

The whole number of species taken was 172; of these, eleven are undetermined, being either *aleocharini* or small things, only one of which is thought to be undescribed; of the others, 97 are very widely distributed; 40 (marked with a †) extend westward in the Gulf States, some of these as far as Texas; while only 25 (marked *), so far as known to the writer, have not occurred northward from Florida.

How many additional species exist in the territory collected over is conjectural, but certainly not more than 150, and these must be largely of species whose larvæ live in wood and fruits or seeds. The character of the soil, that of the flora and the long continued droughts militate against a coleopterous fauna prolific in species. This statement, however, applies only to this and similar localities.

† Cicindela tortuosa, Dej.
† media, Lec.
marginata, Fab.
Pasimachus marginatus, Fab.
Scarites subterraneus, Fab.
Dyschirius var.* falciger, Lec.
Ardistomis obliquata, Putz.
Bembidium contractum, Say.
† Tachys columbiensis, Limer.
nanus, Gyll.
† Loxandrus agilis, Dej.
Diplochila major, Lec.
* Platynus var. floridanus, Lec.
punctiformis, Say.
Galerita lecontei, Dej.
† Tetragonoderus intersectus, Germ.
Lebia marginicollis, Dej.
Brachinus cordicollis, Dej.
Chlaenius fuscicornis, Dej.
laticollis, Say.
Oodes americanus, Dej.
lecontei, Chaud.
Agonoderus infuscatus, Dej.
† Selenophorus fossulatus, Dej.
† Acupalpus rectangulus, Chaud.
Anisodactylus var. merula, Dej.
nitidipennis, Lec.
Copelatus glyphicus, Say.
Thermonectes basilaris, Harr.
* Cybister olivieri, Crotch.
Tropisternus glaber, Hbst.
† Hydrocharis castus, Say.
Philhydrus var. † simplex, Lec.
† Phœnonotum extriatum, Say.
? Homalota, 3 species.
Aleochara bimaculata, Grav.
nitida, Grav.
Creophilus maxillosus, Linn.
Staphylinus prælongus, Mann.
Belonuchus formosus, Grav. var.*
Philonthus hepaticus, Er.
alumnus, Er.
micans, Grav.
Actobius cinerascens, Grav.
Cafius bistriatus, Er.
Xantholinus, sp.
Lithocharis corticina.
Erchomus ventriculus, Say.
Bledius fumatus, Lec.
† punctatissimus, Lec.

Digitized by Google

basalis, Lec.
Coccinella sanguinea, Linn.
Chilocorus bivulnerus, Muls.
Exochomus marginipennis, Lec.
† Contristatus, Muls.
Hyperaspis signata, Oliv.
Silvanus rectus, Lec.
* Hemipeplus marginipennis, Lec.
* Mycetophagidæ.—New gen. and spec.
Dermestes nubilus, Say.
Hister parallelus, Say.
* Chelioxenis xerobatis, Hubbard.
Saprinus pennsylvanicus, Payk.
† placidus, Er.
* ferrugineus, Mars.
sp. not determined.
† Plegaderus barbelini, Mars.
Carpophilus pallipennis, Say.
mutillatus, Er.
Colastus semitectus, Say.
* Brachypeplus glaber, Lec.
Conotelus obscurus, Er.
† Epuræa luteola, Er.
sp. indetermined.
Stelidota geminata, Say.
octomaculata, Say.
strigosa, Gyll.
Omosita colon, Linn.
* Smicrips hypocoproides, Reit.
Tenebrioides corticalis, Mels.
Monotoma fulvipes, Mels.
Heterocerus var.—of substriatus, Mels.
collaris, Kies
Cyphon variabilis, Thunb.
† Lacon curtus, Lec.
Monocrepidius vespertinus, Fab.
auritus, Hbst.
† Ischiodontus ferreus, Lec.
† Orthostethus infuscatus, Germ.
Melanotus dubius, Lec.
sp. indetermined.
Buprestis lineata, Fab.
Chrysobothris floricola, Gory.
Brachys tessellata, Fab.
† Pyropyga minuta, Lec.
† Photinus consanguineus, Lec.
Chauliognathus marginatus, Fab.
Collops tricolor, Say.
Necrobia rufipes, Fab.
Sitodrepa panicea, Linn.
Cis, sp.
† Canthon nigricornis, Say.
Chœridium Lecontei, Harold.
Copris minutus, Drury.
* gopheri, Hubbard.
† Phanæus igneus, MacL.
Onthophagus tuberculifrons, Harold.
* Aphodius troglodytes, Hubbard.
Atænius strigatus, Say.
Trox suberosus, Fab.
scaber, Linn.
Strategus antaeus, Fab.
Cremastochilus harrisii, Kirby.
† Trichius texanus, Horn.
Elaphidion inerme, Newm.
unicolor, Rand.
† Plectromerus dentipes, Oliv.
† Callichroma splendidum, Lec.
Monohammus titillator, Fab.
* Leptostylus transversatus, Ches.
Lema trilineata, Oliv.
Chlamys plicata, Fab.
† Bassareus croceipennis, Lec.
Cryptocephalus binominis, Newm.

Digitized by Google

Pachybrachys, sp.
* Metachroma floridanum, Crotch.
Lina scripta, Fab.
Haltica ignita, Ill.
† Epitragus tomentosus, Lec.
† Polypleurus nitidus, Lec.
† Xylopinus saperdioides, Oliv.
Opatrinus notus, Say.
Blapstinus metallicus, Fab.
† Crypticus obsoletus, Say.
* Phaleria puncticeps, Lec.
† longula, Lec.
† picipes, Say.
Diaperis hydni, Fab.
?*Tachyporus, n.s.
† Platydema micans, Horn.
† Hymenorus densus, Lec.
* floridanus, Casey.
† Hyporhagus punctulatus, Thoms.
† Oxacis thoracica, Fab.
* Mecynotarsus elegans, Lec.
† Formicomus scitulus, Lec.
Anthicus difficilis, Lec.
† Anthicus pallens, Lec.
vicinis La.†
? vicinis var.
Attelabus analis, Ill.
* Pachnæus opalus, Oliv.
* distans, Horn.
* Artipus floridanus, Horn.
† Listronotus setosus, Lec.
† Macrops cryptops, Dietz.
Hylobius pales, Hbst.
Otidocephalus myrmex, Hbst.
* Notolomus basalis, Lec.
* Conotrachelus pusillus, Lec.
* Cryptorhynchus lutosus, Lec.
† . oblongus, Lec.
† Rhyncophorus cruentatus, Fab.
Sphenophorus cariosus, Oliv.
sculptilis, Uhler.
placidus, Say.
Cossonus corticola, Say.
impressifrons, Bohm.
* Mesites rufipennis, Lec.
Xyleborus pubescens, Zimm.

Cicindela—*C. tortuosa* may probably be found active at all seasons, as it was taken on the Indian river, February 9th. It occurred abundantly on the borders of the lake, and also on moist, sandy places in the hummock. *C. marginata* appeared February 21st, and sparingly thereafter. *C. media* appeared on the beach March 1st, and became very abundant onward.

Carabidæ—*Tachys columbiensis* (undescribed) was seen March 1st, and became abundant on the lake shore, seemingly at home in salt water. *Platynus floridanus* was common on the coast after February 25th, and also on land under all kinds of rubbish where there was moisture. *Tetragonoderus intersectus* and *Selenophorus stigmosus* were taken in the garden patches under the dry fallen leaves of vegetables—as cabbage, beets, etc., on March 5th, and thereafter frequently.

Digitized by Google

Dytiscidæ—Hydrophilidæ.—The species listed were taken alive on the ocean side of the lake, and, with one exception, had probably fallen into it during a nocturnal flight from some fresh water lake on the main land. However, *Philhydrus simplex* was quite abundant under stones and sticks on the shores of the lake, and the night of the 10th of March being damp and sultry, a flight occurred, many coming into the house to the light. This form, though only .09 to .11 inch in length, is united with the northern *ochraceus*. *Gyrinidæ* were seen in abundance in a small lake on the main land.

Staphylinidæ--Belonuchus formosus, var. This variety was very abundant at all times in rotting oranges and under damp rubbish; it differs from the typical form in being altogether rufous, except the last two abdominal segments, black. No intermediate forms have been met with, and Mr. Schwarz states it occurs abundantly over all Florida.

Tachyporus, sp.—Two examples were taken under pine bark, greatly resembling my examples of *T. scitulus* from Sweden; the thorax and elytra are identical in coloration, but are not perceptibly punctured when viewed with a lens; the abdomen is more finely margined, and the length is only .06 to .07 inch. *Bledius punctatissimus*, and *B. basalis.*—The latter inhabits the wet sand bordering the lake in countless multitudes, and with it the former, but in much less abundance. *B. fumatus* was not seen till April 1st, and afterwards rarely. One of the types of this species was from Southern California.

Brachypeplus glaber—Five examples of this curious and still rare beetle were taken under the bark of a dead, standing pine, with *Cossonus impressifrons*. Previously I had one example taken near St. Augustine, and the types were from Enterprise, Florida; according to Mr. Schwarz, no others are known in North American collections.

Mycetophagidæ—Belonging to this family several examples were taken in April, of what may, perhaps, be new either generically or specifically, or both. They were sheltering in the folds of Palmetto leaves, on the blossoms of which Mr. Schwarz took them abundantly, both at Lake Worth, and also at Biscayne Bay, and also the larvæ under the bark of various trees; and he also states that it occurs in the West Indies, in Costa Rica, and was taken at the Chicago Exposition, in dried fruits (or seeds?) from Central America.

Digitized by Google

Monotoma fulvipes occurred abundantly in rotting oranges, with *Smicrips hypocoproides* and several small *Nitidulidæ.*

Scarabæidæ—Copris gopheri, Aphodiust roglodytes and the Histeride *Chelioxenis xerobatis* were taken 12 or 15 feet under ground, at a depth of about five feet, with the great sand-digging tortoise, *Gopherus polyphemus. Cremastochilus Harrisii.*—An example was taken April 4th, with a large ant. *Trichius texanus* occurred abundantly in the blossoms of Magnolia, April 10th.

Cerambycidæ—Plectromerus dentipes was taken, March 5th, by bush-beating, and the imago, pupæ and larvæ were found abundantly in the dead branches of a species of Schrankia, which produces the so-called "lucky bean," and which is popularly termed "wait a bit," which one will perforce certainly do on coming in contact with its retrose thorns. *Callichroma splendidum.*—Though I did not take this species, examples were seen which had occurred. These had probably bred in some of the swamps some distance inland.

Tenebrionidæ—Opatrinus notus was at all times excessively abundant, harbouring under boards, etc., on the dry sand. It breeds around the stem of the cabbage Palmetto, among the bases of the fallen leaves. *Crypticus obsoletus* was quite abundant in the same situations, and with it *Platydema nitens*, though less numerous. *Phaleria puncticeps* was rare on the ocean beach, while *P. longula* and *picipes* appeared about March 1st, and gradually became very abundant.

Hyporhagus punctatus—Several examples were taken under the bark of dead seagrape *(cocolobus)*, where they seemed to be in hibernation, though exposed to the sun with a midday temperature of 85°.

Anthicidæ—Mecynotarsus elegans was abundant in cultivated places on spots of sand hot enough to blister. It is difficult to capture on account of its swift, intricate gyrations. A minute ant inhabits the same places, and goes through the same movements. It may be a question whether the ant has learned these motions from the beetle or the beetle from the ant, but the advantage in one direction seems to be on the part of the beetle, as it is usually safe from beetle hunters till accidentally discovered. *Formicomus scitulus* was also abundant under boards and the dead leaves of garden vegetables where there was sand. *Anthicus, sp.*: Several examples were taken under dry cut grass with *Silvanus rectus*.

Digitized by Google

It is very close to the California *confinis*, but may be distinguished by the punctuation being generally finer. It may be a race of *vicinus* without banded elytra and smaller than the type.

Rhyncophoræ—Artipus floridanus, popularly known as the "rose bug," does not seem to hibernate at this season, if indeed it ever does; it exists in great numbers and does as much mischief as its northern namesake; though polyphagous, it seems to have a special fondness for citrus, particularly the lime, destroying the blossoms and young fruit, and likewise nipping the margins of the leaves, which become white, giving the tree a stunted, frosted appearance. On the main land this beetle feeds on the leaves of the live oak, and of such, many are of a brilliant verdigris-green colour, instead of the creamy white of those raised on *citrus*. *Macrops cryptops* and *Listronotus setosus* are found abundantly in the flowers of Sagittaria. *Notolomus basalis* abound from the middle of February till the various Palms are out of bloom. *Cryptorhynchus lutosus* breeds abundantly in the disks (rods) of an abnormal leguminous shrub, *Ecastophyllum brownei*. The most of the fruit ripens and falls from the bush before February, at which time the beetles escape, but the few belated disks found ripening, in nearly every instance contained a beetle in some stage. The determination of both beetle and plant is due to Mr. Schwarz, who had previously taken this insect at Biscayne Bay.

Mesites rufipennis—One example, ♂, was taken on the beach; the antennæ are inserted about the middle of the beak, which is coarsely punctured to the tip, and has the usual frontal fovea and deep groove extending in front of the insertion of the antennæ; on its under side is a deep broad groove extending from the tip to the gula. This species resembles closely immature examples of *M. subcylindricus*, but is more depressed, and the elytral intervals are less convex and more finely punctulate.

Scolytidæ—The examination of dead hardwood indicated that several species of this family were abundant in their season. The larvæ of one small species was observed in almost incredible numbers boring outwards in the bark of *Ficus aurea*, preparatory to pupation; they were so close together that the surface of the back could scarcely be seen. They were white, about .06 inch long, and too numerous to make traceable galleries under the bark, not being wood borers.

Digitized by Google

LIFE HISTORY OF PAPILIO ZOLICAON.

BY ALICE M. JORDAN, NAPA, CAL.

Egg.—On September 2nd, 1893, it was found back of Napa College Laboratory, laid singly on the stem of the flower of wild anise. Nearly spherical, base slightly indented, smooth, bluish-white with grayish shade on one side. Diameter, 1.245 mm. It hatched September 5th, bursting the shell in halves; the shell was white.

First larval stage.—Head rounded, black and shining. Body is largest near the head, with short black hairs rising from two rows of reddish-brown tubercles on segments 2, 3, 4, 5, 6, 9, 10, 11 and 12 on each side of the centre of the dorsal surface, one row near the centre, the other quite low on the side. On segments 7 and 8 are a number of irregular-shaped white spots. Coloured dark brown, scent organs bluish-white.

September	6	—	Diameter,	.65	mm.;	length,	3.40 mm.
"	7	"		.80	"	"	3.90 "
"	8	"		.89	"	"	4.38 "
"	9	"		.98	"	"	4.75 "
"	11	"		1.05	"	"	5.90 "
"	12	"		1.08	"	"	6.00 "
"	13	"		1.20	"	"	6.40 "
"	14	"		1.45	"	"	6.85 "
"	15	"		1.58	"	"	6.89 "
"	18	"		1.64	"	"	7.30 "
"	19	"		1.69	"	"	7.40 "
"	20	"		1.70	"	"	7.44 "

Second larval stage.—Head slightly retracted under joint 2; rounded, greenish with a black v-shaped line, the lower part of the v at the upper part of the head, and a short black line in centre of v and two on each side at base. The tubercles on segments 2, 3, 4, 5, 6, 9, 10, 11 and 12 are more hairy. The irregular white spots on segments 7 and 8 are somewhat larger. Both the dorsal and ventral sides are brown.

September	21	—	Diameter,	1.98	mm.;	length,	7.55 mm.
"	22	"		2.00	"	"	8.00 "
"	23	"		2.20	"	"	8.35 "
"	25	"		3.00	"	"	10.25 "
"	26	"		3.50	"	"	11.00 "
"	27	"		4.00	"	"	12.00 "
"	28	"		4.00	"	"	12.00 "

Digitized by Google

Third larval stage.—Head as before; tubercles on 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 are hairless and of a bright orange colour. The body is brown on dorsal side and brown mottled with green on ventral side. Scent organs yellow and slightly larger than before.

September	29	—Diameter,	4.10	mm.;	length,	18.	mm.
"	30	"	4.10	"	"	19.	"
"	31	"	4.30	"	"	20.	"
October	2	"	4.50	"	"	21.	"
"	3	"	6.00	"	"	21.	"
"	4	"	6.50	"	"	21.5	"

Fourth larval stage.—Head as before; body smooth, ventral side light green mottled with brown; dorsal side slightly yellowish on segment 2 round scent organs; from 2 to 12 the segments are in colour,—in the centre of each a black line in which are four yellow spots, two on each side; on each side of the black line there is a narrow bluish line; on the outside of these is a brown line, which is on the joint, and when the caterpillar is not crawling these brown lines are invisible. The 12th segment is bluish mottled with black. Scent organs are yellow.

October	5	—Diameter,	6.00	mm.;	length,	25.	mm.
"	6	"	6.50	"	"	26.	"
"	7	"	6.98	"	"	30.	"
"	8	"	7.50	"	"	35.	"
"	9	"	8.00	"	"	40.	"
"	10	"	9.00	"	"	40.	"
"	11	"	10.50	"	"	40.	"
"	12	"	10.50	"	"	43.	"

From the 12th of October until the 23rd, it remains the same size, and on the 23rd it attached the 12th segment to a stem of the food plant, spun a web until the web was between the 6th and 7th segments, drawing itself together as much as possible, it was ready to go into the next stage.

Chrysalis.—Cylindrical, the abdomen tapering, a slight depression between thorax and abdomen, a blunt trigonate thoracic prominence projecting forward parallel with a similar process over each eye; a slight lateral projection at base of wing-case and a row of subdorsal abdominal elevations, four of which are most distinct, also a row of openings lower down on each side. Colour light green mottled with light brown; wing-cases same colour, only streaked longitudinally instead of being mottled; the end of the thoracic projection is a dark brown; the similar processes over each eye are darker brown. A narrow band of dark brown extends the length of the body on both sides; from these bands extending along the base of the wing-cases are small elevations, seven of which are very distinct. October 25th: diameter, 7 mm.; length, 27 mm.

Digitized by Google

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

IV. The Pleurostict Scarabaeidæ of Ontario and Quebec.

In this group we have in some of the genera a return to the cephalic and thoracic ornamentation by horns or tubercles in the males, as shown in the Coprophaga; however, none of the Canadian species would be thus misplaced by anyone having even a slight acquaintance with the family, as aside from this character the resemblance is slight. From some of the Melolonthinæ they are not so readily distinguished, except by the position of the spiracles, as defined in a previous article. The genera may be thus separted among themselves:

A. Claws of tarsi unequal in size.

b. Length not more than about ½ in. Antennæ 9-jointed.

Elytra conjointly very convex above, often more or less distinctly striate and punctate in rows..... *Anomala.*

Elytra flat, distinctly sulcate ..... *Strigoderma.*

bb. Length greater, nearly or quite an inch. Antennæ 10-jointed.

Elytra immaculate..... *Cotalpa.*

Elytra with black spots ..... *Pelidnota.*

AA. Claws of tarsi equal.

c. Very small (about 25 in.). Colour brown, with indistinct lighter marks, thorax distinctly channelled..... *Valgus.*

cc. Larger (.40 to above an inch).

d. Elytra deeply sinuate behind the humeri..... *Euphoria.*

dd. Elytra without more than a faint indication of this sinuation.

e. Thorax much narrower than elytra, often much narrowed at base.

f. Size small (.50 in. or less).

Colour uniform black..... *Cremastochilus.*

Elytra luteous with black spots..... *Gnorimus.*

Elytra rufotestaceous, or with transverse bands of that colour and white..... *Trichius.*

ff. Size large (nearly an inch), colour uniform..... *Osmoderma.*

ee. Thorax not narrowed at base beyond the effect produced by the rounding of the sides and about as wide as the elytra.

g. Head entirely unarmed, clypeus simple..... *Cyclocephala.*

Digitized by Google

gg. Head with a low transverse carina anteriorly, clypeus always toothed.

Clypeus simply bidentate at tip.....*Ligyrus*.

Clypeus with an elevated tridentate process *before* the tip..... .....*Aphonus*.

ggg. Head with a long horn (♂) or a tubercle (♀) on the vertex .....*Xyloryctes*.

The placing of a specimen in position by means of the claws is easy, as the inequality in the inner and outer ones in the species comprised in group A is very marked. As most of the genera have but one species belonging within our faunal limits, they present no difficulty in the way of correct specific determination.

ANOMALA, Kœppe.

Two species of very variable colour and rather small size (.30 to .40 in.) are found here.

Thorax with distinct basal marginal line; colour variable, elytra usually with two transverse bands of dark spots...*undulata*, Mels.

Thorax without basal marginal line, colour black to yellow.....*lucicola*, Fabr.

STRIGODERMA, Burm.

One species (*S. arboricola*, F.) about .40 inch. in length, resembling Anomala in form, but the elytra are flat and distinctly sulcate. The thorax is dark brown with a metallic lustre, the outer and basal margins pale, the elytra are clay-coloured. It may be found on flowers during the day.

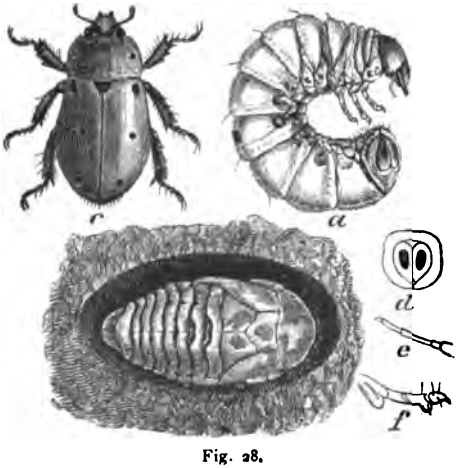


Fig. 28.

PELIDNOTA, MacLeay.

The "grape beetle," *Pelidnota punctata*, Linn., is our only representative. It is about an inch in length, brownish yellow, a black spot near the middle of the thoracic side margin, and three on each elytra (Fig. 28, *a* larva; *b* pupa; *c* beetle; *d* anal mark on larva; *e* antenna, and *f* leg of larva).

Digitized by Google

COTALPA, Burm.

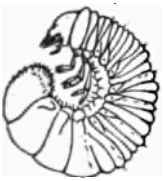


Fig. 30.

One species, the "goldsmith beetle," *Cotalpa lanigera*, Linn. (Fig. 29, beetle; fig. 30, larva), is found in our fauna. It is about the size of the preceding species, and has the head and thorax golden, the elytra cream-coloured, with a slight bluish cast. Beneath metallic green, woolly.

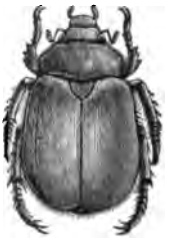


Fig. 29.

CYCLOCEPHALA, Latr.

C. immaculata, Oliv., has once been reported by Mr. Moffat. It is a yellowish or reddish testaceous insect about half-an-inch in length, the head dark or even black. It bears some slight resemblance to certain *Lachnosterna*, but has shorter legs.

LIGYRUS, Burm.

The two beetles belonging to this genus differ greatly in size, and are otherwise easily separated. They are brownish in colour, heavier than *Lachnosterna* in appearance and with shorter legs. *Ligyrus relictus* breeds in old manure heaps.

Thorax without tubercle in front; length, .70-.90 in.....*relictus*, Say.
Thorax with a tubercle near the middle of anterior margin; length, .48-.67 in.....*gibbosus*, De G.

APHONUS, Lec.

A single species bearing considerable resemblance in size, form and colour to *Ligyrus gibbosus* is recorded. It may easily be distinguished, however, by the lack of the thoracic tubercle and by the clypeus bearing a tridentate process before the tip, whence the name *A. tridentatus*, Say.

XYLORYCTES, Hope.

To this genus belongs the large *X. satyrus*, Fabr., which attains a length of above an inch and is correspondingly heavy. The male has a long horn, curved backwards at tip, while the female has the head ornamented simply with a small tubercle on the vertex.

Fig. 31.

EUPHORIA, Burm.

Two species belong here, similar in shape, but easily separated. These are *E. inda*, Linn., (Fig. 31) and *E. fulgida*, Fabr. (Fig. 32), distinguished thus:

Fig. 32.

Thorax very hairy above, elytra luteous with

Digitized by Google

small, black spots.....*inda*, Linn.
Thorax naked and polished above, green with yellow margin, elytra brownish red, with green surface lustre in places...*fulgida*, Fabr.

CREMASTOCHILUS, Knoch.

The only recorded species is *C. harrisii*, Kirby, a rather elongate and flattened, black insect, .40 inch in length, the surface shining. The thorax has a very peculiar appearance, because of the angles being separated from the disk by rather deep impressions. The mentum is large and somewhat cupuliform, with a rather deep and broad notch behind. We figure it after Dr. Horn (Fig. 33).

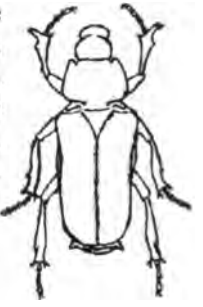


Fig. 33.

OSMODERMA, Lep.

This genus includes two very large, dark coloured beetles, with the thorax much narrower than the elytra. They may be known apart thus:

Fig. 34.

Elytra nearly smooth, polished...*eremicola*, Knoch.
Elytra rough, scabrous, thorax with a rather deep channel.....*scabra*, Beauv.

Fig. 34 represents *O. scabra*.

GNORIMUS, Lep.

G. maculosus, Knoch, is the only species. It resembles *Trichius*, but the elytra are yellowish (luteous) with numerous black spots.

TRICHIUS, Fabr.

Three species are on the Canadian lists; all are to be found on flowers, especially wild rose and *Spiræa*, during the heat of the day, and fly readily when disturbed. The elytra are usually marked with transverse white bands. They may be tabulated as follows:

A. Elytra rufo-testaceous, without transverse bands or velvety lateral space.....*bibens*, Fabr.
AA. Elytra with white transverse bands and lateral velvety spaces.
Second and fourth elytral intervals moderately densely punctate.....*piger*, Fabr.
Second and fourth intervals very sparsely punctate...*affinis*, Gory.

All are only moderate-sized insects, with rounded thorax, narrower than the elytra, and very long legs.

Digitized by Google

VALGUS, Scriba.

A very small, brown species, *canaliculatus*, Fabr., (.25 inch), looking something like a diminutive *Osmoderma*, is our only representative. The thorax is distinctly channelled, the elytra very much flattened, and with indistinct yellowish or whitish markings across the middle and near the tip.

The following bibliography includes most of the more important papers in which the North American Scarabaeidæ have been treated in synoptic or more or less monographic form :

1856. Leconte, J. L. Synopsis of the Melolonthidæ of the U. S. Jour. Acad. Nat. Sci., Phil., Vol. III., Series II., pp. 225–288.

1856. Leconte. Notes on three genera of Scarabaeidæ, found in the U. S. Proc. A. N. S., Phil., Vol. VIII., pp. 19–25.

1867. Horn, Geo. H. Descriptions of new genera and species of Western Scarabaeidæ. Tr. Am. Ent. Soc., Vol. I., pp. 163–169.

1868. Horn. Geotrupes of Boreal America. Trans. Am. Ent. Soc., Vol. I., pp. 313–322.

1870. Horn. Note on some genera of Coprophagous Scarabaeidæ of the U. S. Trans. Am. Ent. Soc., Vol. III., pp. 42–51.

1870. Horn. Description of the species of Aphodius and Dialytes of the U. S. Trans. Am. Ent. Soc., Vol. III., pp. 110–134.

1871. Horn. Synopsis of the Aphodiini of the U. S. Trans. Am. Ent. Soc., Vol. III., pp. 284–297.

1871. Horn. Descriptions of new Coleoptera of the U. S., with notes on known species. Trans. Am. Ent. Soc., Vol. III., pp. 325–344.

1874. Leconte. Note on the genus Pleocoma, Lec. Trans. Am. Ent. Soc., Vol. V., pp. 81–84.

1874. Horn. Revision of the species of Trox of the U. S. Trans. Am. Ent. Soc., Vol. V., pp. 1–12.

1875. Horn. Synonymical notes and descriptions of new species of N. A. Coleoptera. Trans. Am. Ent. Soc., Vol. V., pp. 126–156.

1876. Horn. Revision of the U. S. species of Ochodæus and other genera of Scarabaeidæ. Trans. Am. Ent. Soc., Vol. V., pp. 177–197.

1878. Horn. Revision of the species of Listrochelus of the U. S. Trans. Am. Ent. Soc., Vol. VII., pp. 137–148.

Digitized by Google

1879. Horn. A monographic revision of the species of Cremastochilus of the U. S. Proc. Am. Phil. Soc., Vol., XVIII., pp. 382–397.

1879. Horn. Synopsis of the Euphoriæ of the U. S. Proc. Am. Phil. Soc., Vol. XVIII., pp. 397–408.

1880. Horn. Contributions to the Coleopterology of the U. S., No. 3. Trans. Am. Ent. Soc., Vol. VIII., pp. 139–154.

1881. Horn. Revision of the species of Polyphylla of the U. S. Trans. Am. Ent. Soc., Vol. IX., pp. 73–76.

1882. Horn. Notes on some little-known genera and species of Coleoptera. Trans. Am. Ent. Soc., Vol. X., pp. 113–126.

1884. Horn. Notes on the species of Anomala inhabiting the U. S. Trans. Am. Ent. Soc., Vol. XI., pp. 157–164

1885. Horn. Descriptions of some new N. A. Scarabaeidæ. Trans. Am. Ent. Soc., Vol. XII., pp. 117–128.

1885. Blanchard, Fred'k. On the species of Canthon and Phanæus of the U. S., with notes on other genera. Trans. Am. Ent. Soc., Vol. XII., pp. 163–172.

1887. Horn. A monograph of the Aphodiini inhabiting the U. S. Trans. Am. Ent. Soc., Vol. XIV., pp. 1–110.

1887. Horn. Revision of the species of Lachnosterna of America, north of Mexico. Trans. Am. Ent. Soc., Vol. XIV., pp. 209–296.

1888. Horn. Review of the species of Pleocoma, with a discussion of its systematic position in the Scarabaeidæ. Trans. Am. Ent. Soc., Vol. XV., pp. 1–18.

1888. Blanchard. Some account of our species of Geotrupes. Psyche, Vol. V., pp. 103–110.

1889. Casey, Thos. L. Coleopterological Notices, I. Ann. N. Y. Acad. Sci., V., pp. 40–198. (Table of Thyce.)

ERRATUM.—Page 229, fifth line from bottom, for "Club three-jointed" read "Club many-jointed."

Mailed September 6th.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, OCTOBER, 1894. No. 10.

SIXTH ANNUAL MEETING OF THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

(ABSTRACT OF PROCEEDINGS BY THE ACTING SECRETARY.)

Morning Session—August 14, 1894.

The Association met at 10 a.m., in Room 12 of the Packer Institute, Brooklyn, N. Y., August 14th, 1894. The following officers and members were present:

President, L. O. Howard, Washington, D. C.; Vice-President, J. B. Smith, New Brunswick, N. J.; Acting Secretary, C. L. Marlatt, Washington, D. C. Messrs. William H. Ashmead, Washington, D. C.; Geo. F. Atkinson, Ithaca, N. Y.; Nathan Banks, Sea Cliff, N.Y.; D. W. Coquillett, Washington, D. C.; Geo. C. Davis, Agricultural College, Mich.; A. D. Hopkins, Morgantown, W. Va.; Geo. H. Hudson, Plattsburg, N. Y.; J. A. Lintner, Albany, N. Y.; V. H. Lowe, Jamaica, N. Y.; F. W. Raine, Morgantown, W. Va.; William Saunders, Ottawa, Canada; E. B. Southwick, Central Park, New York City; F. A. Sirrine, Jamaica, N. Y. There were also in attendance upon the meetings visitors and members of other scientific societies, the average attendance being twenty-five persons.

The meeting was called to order by the President, and in the absence of the Secretary, Mr. Gillette, Mr. C. L. Marlatt was elected secretary for the meeting.

The President, Mr. L. O. Howard, of Washington, D. C., delivered his annual address, which was entitled "The Rise and Present Condition of Official Economic Entomology," the scope of which is sufficiently explained by the title.

On motion of Dr. Lintner, the thanks of the Society were unanimously extended to the President for the admirable address presented.

A letter from the Secretary, Mr. Gillette, announced that he would be unable to attend the meeting.

Digitized by Google

The following active members were elected :

F. C. Test, C. E. Chambliss and H. G. Hubbard, all of the Department of Agriculture, Washington, D. C. ; Victor H. Lowe and F. A. Sirrine, of Jamaica, N. Y. ; and F. W. Raine, of Morgantown, W. Va.

The following persons were elected to foreign membership :

Walter W. Froggatt, Technological Museum, Sydney, N. S. W.

Charles Whitehead, Barming House, Maidstone, Kent, England.

Geo. H. Carpenter, Science and Art Museum, Dublin, Ireland.

Dr. Geza Horvath, Ministry of Agriculture, Buda Pesth, Austria.

Prof. A. Targioni-Tozzetti, R. Staz. d. Entom. Agric., Firenze. Italy.

Prof. A. Giard, 14 Rue Stanislas, Paris, France.

M. J. Danysz, Laboratoire de Parasitologie, Bourse de Commerce, Paris, France.

Dr. J. Ritzema Bos, Wageningen, Netherlands.

Mr. Sven Lampa, Entomologist, Dept. Agric., Stockholm, Sweden.

Dr. N. Cholodkowsky, Institute Forestier, St. Petersburg, Russia.

Dr. K. Lindemann, Landwirthschaftliche Akademie, Moscow, Russia.

Prof. A. Portschinsky, Bur. Entom., Ministère de l'Agriculture, St. Petersburg, Russia.

Mr. E. C. Reed, Banos de los Cauquenos, Chile.

Mr. J. B. Smith, New Brunswick, N. J., presented a paper on the use of bisulphide of carbon as an insecticide, in which he described a very considerable number of experiments in the use of this substance against the Melon Louse (*Aphis cucumeris*, Forbes), one of the most destructive pests in parts of New Jersey and a very difficult insect to deal with. He used the bisulphide by introducing it about the plants under wooden boxes or bowls, placing the bisulphide directly on the ground under the boxes and also in various receptacles. He concluded that, in melon fields at least, bisulphide of carbon could be used very effectively, and particularly in stamping out an invasion at its very outset, while the plants are still of small size.

The paper was discussed by various members, Mr. Southwick describing a combination of bisulphide with "Polysolve," which he had used in the form of an emulsion ; and Mr. Lintner suggesting the use of cloth coverings in place of the boxes employed by Mr. Smith. Mr. Galloway suggested the use of the protection cloth used by seedsmen, which is treated with oil and is practically air-tight. Mr. Howard referred to the original suggestion by Garman, of the use of a washtub, which

Digitized by Google

was thought to be very satisfactory for limited applications; and Mr. Smith and Mr. Saunders suggested the use of paper caps, similar to but smaller than those used by farmers for the protection of the hay crop. The subject of the relation of parasites to the control of the louse was also discussed, as well as the effect of the bisulphide on the plants themselves, also upon the germination of seeds, when employed for the eradication of grain pests, etc.

Afternoon Session—August 14, 1894.

The report of the committee appointed last year, on co-operation among station entomologists, was presented by Mr. Smith, in the absence of the chairman. The report covered the matter of concerted work upon the life-history of special insects and their geographical distribution, the selection of certain groups of species to be studied from year to year, co-operation in experimentation with insecticide machinery to avoid duplication, and suggestions in the matter of securing conjoint legislative action among the States. The report was accepted and ordered to be printed, so that opportunity might be afforded members to examine it, in order to be able to take definite action on its adoption at the meeting of 1895.

A letter from Miss Eleanor A. Ormerod was read by the President, in which she expressed her regret at being unable to be present at the meeting.

A paper by Mr. J. M. Aldrich, on spraying without a pump, was read in his absence by Mr. Davis. This paper described a scheme for the mechanical mixture of water and oil by the use of an ordinary Nixon Climax Nozzle, the combination of the water and oil being made in the nozzle itself.

In the next paper Mr. C. L. Marlatt gave a review of a number of experiments conducted during the present year with several standard insecticide mixtures, also a series of experiments testing certain of the more important new insecticides or substances which seem to be of value as insect destroyers recently put before the public. The work was mainly to determine (1) the best methods of treating scale insects; (2) the effect of various mixtures on trees and foliage, in both summer and winter applications; (3) to show the relative merits of the old insecticides compared with some of the newer ones, and (4) also the possibility of successfully combining insecticides and fungicides.

The paper was discussed by Messrs. Smith, Galloway and others.

Digitized by Google

Professor Galloway followed with a paper on various insecticide substances, with which he had been experimenting for a number of years past, many of them in lines which had not hitherto been worked to any extent. He discussed particularly the kerosene emulsion made with lime, with resin wash, and with Bordeaux mixture. He also described a new method of making resin wash, devised by one of his field agents in Florida, which, briefly, consisted in using purer caustic soda, causing a much more rapid formation of the resin soap. Various other mixtures of possible insecticide value were also suggested. The paper was accompanied by the exhibition of a large series of vials, illustrating the various mixtures and combinations described by the author. The communication was generally discussed, and the important point emphasized that none of the emulsions were as perfect or as permanent as the standard milk and soap emulsions in common use, although some of them are possibly of value for immediate application.

Mr. Webster's paper on "Spraying with Arsenites vs. Bees" was read, in the absence of the author, by the Secretary. The conclusions arrived at were that arsenic is always present in the abdomens of bees frequenting recently sprayed blossoms, and more or less of it reaches the honey sacs; and that bees are, therefore, liable to be poisoned by spraying the bloom of fruit trees. He claimed that his experiments were the first to show conclusively that actual poisoning does result to bees under the conditions mentioned.

In the discussion, Mr. Lintner stated that even in the event of actual harm resulting to the bees, the question is still an open one, for the reason that many noxious insects frequenting fruit blooms are also destroyed. The paper was further discussed by other members.

Mr. Southwick presented a paper on economic entomological work in the parks of New York City, in which he described the general character of the means employed to control destructive insects in the principal parks of New York; he also gave some notes on the occurrences of and damage due to the principal insect pests with which he had to contend. A general discussion of the paper followed, which was participated in by most of the members present.

Mr. Southwick followed with a second paper on the Wood Leopard Moth in the parks of New York, giving an historical account of the insect, its present status, the nature of the injury, the plants affected, and the means he had adopted to exterminate the pest. He stated that this is a

Digitized by Google

most difficult insect to control, and could only be reached by cutting off the affected limb. In the case of rare trees, he had adopted the plan of putting a little bisulphide of carbon in the larval burrow with an oil can, closing the entrance with putty, which had proved an effective remedy.

The paper was discussed by Messrs. Smith, Howard, and others.

In the absence of Prof. F. H. Snow, of Lawrence, Kansas, his paper was read by Mr. Victor H. Lowe. This communication, entitled "Work in Economic Entomology at the University of Kansas for the season of 1894," related particularly to the work with the Chinch Bug disease (*Sporotrichum globuliferum*), and a new alfalfa and wheat pest, which proved, on rearing, to be *Agrotis introferans*, Grote.

Mr. Smith reported that the same Noctuid had been found by Mr. Gillette to occur very abundantly the present year in Colorado, and Mr. Howard referred to the occurrence of the moth in enormous numbers in Nebraska.

Messrs. Ashmead, Lintner and Hopkins were appointed by the President a committee to nominate officers for the ensuing year.

Morning Session—August 15, 1894.

Mr. Hopkins presented notes on some discoveries and observations of the year in West Virginia. The paper dealt chiefly with wood-working insects, but also covered various garden pests, such as the Potato-scab Gnat, the Melon Plant-louse, etc. The paper was discussed at some length by Mr. Smith, Dr. Lintner, Mr. Raine, and others.

The President read a letter from Mr. Webster, stating that he was unable to be present, on account of being actively engaged in stamping out an attack of Fidia larvæ on grape roots, by the use of bisulphide of carbon.

Mr. Howard read a paper on the Eastern occurrences of the San José scale, in which he briefly reviewed the history of the insect in the United States, and showed that as a result of investigations during the winter of 1893–4, and the summer of 1894, the scale has been discovered in six localities in the Eastern United States outside of New Jersey, while in the latter State it occurs at many points. He traced the introduction to two nursery firms in the State of New Jersey, and one in Missouri. He detailed in full the remedial work which has been undertaken by the Division of Entomology of the U. S. Department of Agriculture in each of the six Eastern localities, and showed that by virtue of the active measures

Digitized by Google

which have been taken, the insect will probably be stamped out in the East by the close of the season.

The next paper was on the same subject, and discussion was therefore deferred.

Mr. Smith then read a paper on the San José scale in New Jersey. He stated that the scale had first come to him from a nursery in the State in March, 1892, but had not been recognized, and he did not become aware of the true nature of the insect until he received the special circular sent out by the U. S. Department of Agriculture early in 1894. He described his work in connection with the stamping out of the scale, and particularly the active and energetic steps taken by the owners of the infested nurseries, from which the scale had been exterminated on young stock. He reported sending out letters to all persons who had obtained stock from the nurseries in question, enclosing the circular from the Department of Agriculture referred to, and the examination of nearly 100 orchards in person. As a result of his observations and work, he felt confident that the scale would ultimately be completely stamped out. The introduction of the scale was shown to have been either in 1886 or 1887, on some plum stock claimed to be curculio-proof, obtained from the San José region in California. Other fruit trees imported from California were also shown to be very likely infested. He gave some facts in regard to the trees and varieties which are most liable to be infested, also some notes on remedies.

In the discussion of these two papers, Dr. Lintner considered the possibility of the introduction of the scale on fruit from California, and concluded that the likelihood of the scale, so introduced, obtaining a foothold was very slight.

Mr. Marlatt thought there was danger in placing too much confidence in the work or the statements of nurserymen as to the completeness of the eradication of the scale, pointing out the great difficulty of thorough extermination and the ease with which a random scale here and there could be overlooked. Mr. Banks referred to the publication in a New York paper of occurrences of the scale in two or three localities in New York, accompanied with the report of the adoption of active measures to stamp it out in each instance.

Afternoon Session—August 15, 1894.

In continuation of the discussion of the morning session, Mr. Smith

Digitized by Google

exhibited specimens of California pears, obtained in Brooklyn, which were covered with the San José scale in all stages of development.

Mr. Lintner exhibited an apple coming from Ottawa, Canada, handed to him by Mr. Saunders, which was covered with the scales of *Mytilaspis pomorum.*

Mr. Davis read a paper on Mealy Bugs and other lice. He gave a careful résumé of the life-history of the common Mealy Bug *(Dactylopius destructor)*, with detailed descriptions of the different stages; also some notes on *D. longifilis.* He also described a Coccus which he found on roots of clover, giving a general account of the habits and careful descriptions of the species. He also referred to *Eriococcus azaleæ* and other scale insects.

The paper was discussed by Messrs. Sirrine, Ashmead and Howard. Mr. Sirrine thought Mr. Davis's clover Coccus was the same as the one found by Professor Forbes on white clover, and named by him *Coccus trifolii,* Mr. Ashmead coinciding in this view, and Mr. Howard stating that the *Eriococcus azaleæ* was certainly not an introduced species from Belgium, as suggested by the author, since the species is not known in Europe, and Professor Comstock has found it on wild plants near Ithaca, indicating that it is undoubtedly a native species. He said also that the two old species of Dactylopius referred to by the author had been shown by Berlese to be synonymous with European species, and that their life-histories had been worked out by this author in great detail.

Mr. Marlatt read a paper on the Pear-tree Psylla in Maryland, in which he described the sudden occurrence of this Northern pear pest in two orchards on the eastern shore of Maryland, in very destructive numbers. The introduction of the species was shown to have been upon nursery stock from infested regions in New York, and the author was confident that the injury, while excessively severe for the moment, would not be of long duration, judging from the past history of the insect. A brief review of the life-history was given, with some notes on the natural enemies, notably a species of lace-wing fly *(Chrysopa oculata)*, the larva of which feeds voraciously on all stages of the Psylla; also various species of lady-birds, which are useful in a similar way. The life-history of the lace-wing fly was carefully worked out. Experiments with various insecticides on the eggs of the Psylla were detailed, and general recommendations for remedial work were given.

Digitized by Google

The paper was discussed by Messrs. Davis, Southwick, Lintner, and others, both Messrs. Southwick and Lintner reporting cases of sudden appearance of the Psylla, with subsequent equally sudden disappearance.

Mr. Smith deferred speaking until the reading of his own paper, which included a reference to the same insect, in which he said that the conditions described by Mr. Marlatt were identical with the conditions obtaining in localities in New Jersey, and that the source of the introduction was also the same.

Mr. Smith then read a paper, entitled "Notes of the Year in New Jersey," which was a summary of the important insects brought to the attention of the Entomologist during the present season. It contained references to occurrences of the Pear-tree Psylla, the Pear Blister-mite, the Pear Midge, a new pear pest in a species of Agrilus, probably *anxius*, the habits of this last insect being described at some length. The paper also considered the use of protective coverings for the trunks of trees as a means against the borer; invasions of cutworms; the Periodical Cicada; some potato insects; onion maggots; the remarkable mortality of the Clover-leaf Weevil larvæ, and the Potato-stalk Borer, *Trichobaris trinotatus*, which had been brought to his attention for the first time the present year. The paper was discussed by most of the members present.

Mr. Davis also presented a communication covering notes on special economic insects of the season in Michigan, referring particularly to the occurrence of *Diplotaxis Harperi* as a strawberry pest, a Dipteron raspberry girdler, *Adimonia clavicollis*, as a cherry-tree defoliator, *Notoxus anchora*, as feeding on fruit of cherry.

In the discussion, Mr. Hopkins stated that he had found the raspberry cane maggot, described by Mr. Davis, in the Alleghany Mountains in 1892, but did not rear the adult.

In the absence of Mr. Chittenden, his paper, entitled "Supplementary Notes on the Strawberry Weevil, its Habits and Remedies," was read by Mr. Southwick. The writer noted the occurrence of the Strawberry Weevil (*Anthonomus signatus*, Say.) in more or less injurious numbers in parts of Maryland, Virginia, Delaware, Pennsylvania and New Jersey in 1893 and 1894. Three new food-plants were discovered, the red-bud (*Cercis Canadensis*), the dewberry and raspberry, and the life-cycle from egg to adult was found to extend over a period of four weeks. The methods of oviposition and of severing stems are described. A table showing by States the destructive appearances of the insect from 1871 to

Digitized by Google

date is given. Under the head of remedies, the necessity of clean culture is pointed out, also the benefit that might be derived from early-blooming varieties of staminates, and of the red-bud tree as trap-crop. Kerosene emulsion and Paris green were found by experiment to be of service, but the latter gave the better results. Directions are given for the applications of these insecticides, three or four sprayings being advised, beginning two or three days before first bloom. The subject of covering beds is considered, and in conclusion the fruit grower is urged not to trust entirely to staminate varieties.

Mr. Smith said he had anticipated damage from this insect the present season, but so far as he had observed, it did not manifest itself in New Jersey.

In view of the lateness of the hour, the following papers were read by title only :

"Notes on the Insects of Northern Idaho," by J. M. Aldrich, Moscow, Idaho. This paper included a few notes on the principal pests of the "Pan-handle" district of Idaho, where the farming land is at an elevation of 700 to 3,500 feet, with a corresponding change in climate. The insects discussed were the Wheat Aphis, the Codling Moth, Bud Moth, Woolly Aphis, Pear-leaf Blister-mite and the San José scale, which latter the author stated was the most dreaded insect pest, and a considerable effort was being made to prevent its spread to new localities.

"Insects of the Year," by F. M. Webster, Wooster, Ohio. Mr. Webster's paper had particular reference to the occurrence of the larvæ of *Fidia viticida*, Walsh, in vineyards, which was the important insect manifestation of the year in Ohio. It also covered the Raspberry Agrilus, the strawberry Weevil, the Pear-tree Blister-beetle, joint worms, the Bean Leaf-beetle and other garden and small-fruit pests, such as the Grain Louse, Corn Bill-bug and a Thrips which is proving very destructive to onion crops. Other insects were also mentioned briefly.

"Notes from New Mexico," by T. D. A. Cockerell, Las Cruces, N. M. This paper covered numerous short notes on various insects observed in New Mexico, with a description of the climatic and other conditions characteristic of the more important natural districts of the State, and the bearing of these on the insect fauna.

"Some Experience with Mosquitoes," by Howard Evarts Weed, Agricultural College, Miss. This communication covered the result of certain experiments in the use of kerosene as a means of preventing the breeding

Digitized by Google

of mosquitoes in water reservoirs on the college campus. The use of kerosene was very satisfactory, and resulted in a very marked subsidence of the mosquito trouble. The author also reports that kerosene is a very good preventive to apply to the hands or face in the case of mosquito outbreaks.

The report of the committee on nominations was presented by Mr. Lintner, as follows :

President—J. B. Smith.

Vice-President—C. H. Fernald.

Secretary—C. L. Marlatt.

The report was unanimously adopted and the officers named duly elected. (By inadvertence no second vice-president was nominated or elected.) It was decided to follow the usual custom for the next meeting, and hold it on the two days preceding the meeting of the American Association for the Advancement of Science, and at the place decided upon for the next meeting of that Association. On motion, it was requested that the minutes be printed in full in "Insect Life."

After the reading and approval of the minutes of the entire session, Mr. Southwick moved that the thanks of the Association be tendered to the President and Secretary for the able and satisfactory manner in which they had discharged their respective duties.

The resolution was adopted.

The Association was then declared adjourned by the President for one year. C. L. Marlatt, Acting Secretary.

SEXUAL CHARACTERS IN SCOLYTIDÆ.

(A Preliminary Contribution.)

BY A. D. HOPKINS, ENTOMOLOGIST OF THE WEST VIRGINIA EXPERIMENT STATION.

(Read before section F. of A. A. A. S., Brooklyn, Aug. 20th, 1894.)

It appears that comparatively little is known regarding the external sexual characters of species in the family Scolytidæ. Indeed, the species of this family are among the most difficult of Coleoptera to study, or to properly identify, unless one has access to a large series of correctly named and classified examples. It is not so surprising, then, that more or less confusion exists with reference to descriptions of the sexes, and that numerous mistakes have been made in following the classifications and

Digitized by Google

sexual characters given by those Specialists whom we recognize as the best authority on the subject.

There is considerable difference of opinion among Specialists regarding the external sexual characters of species in the genus Platypus as based upon those given by Dr. Chapuse in his Monographie des Platypids. With a view of satisfying myself on this question, I dissected a number of alcoholic and dried examples of male and female *P. quadridentatus* and *P. compositus*. The results convinced me that the male and female characters given in the description of these two species are reversed.

The fact that descriptions of male and female Scolytids are based largely upon the characters given by Chapuse causes me to question the correctness of interpretations of the external sexual characters in other genera.

This led to the commencement of a systematic study of the sexual characters of all the species of which I had sufficient material. A number of male and female examples of *Xyloterus retusus*, *Xyloterus bivittatus*, *Xyleborus dispar*, and *Xyleborus obesus* were first dissected and a careful study of the male and female genitalia was made. I found that the male organ, while exhibiting remarkable differences in the species of the two genera, possesses certain peculiarities by which it can be readily recognized, even in dried specimens. Guided by this, I continued the investigation until male and female examples of thirty-seven species, representing seventeen genera, were dissected.

According to my interpretations, based upon the finding of the male genitalia in the species examined, the sexual characters, as given by Le Conte in Rhynchophora of America, North of Mexico, are wrong in ten species out of five genera, and correct in ten species out of nine genera. In fourteen species out of ten genera external sexual characters were determined, which were previously unknown to me, and most of them are probably new to science. In three species out of three genera, no distinctive or constant characters were observed by which the sexes could be designated.

While the external sexual characters appear to be constant with the species in some genera, in others no particular character is possessed by all of the species. In fact, what may be a good male or female character in one species will be reversed in another species of the same genus.

The greater development of the elytra and abdominal armatures is a

Digitized by Google

good male character in some species, but not in others. The frontal concavity is a good male character in some genera, but is reversed in others. The flattened or concave front fringed with long hairs is a good male character in some species, but is of no value in others, as we have found it either absent or reversed in species of the same genera. Size and colour appear to be of no value except in Xyleborus, where the male is, as far as known, very much smaller and usually paler than the female. Long hairs or bristles on the antennal club appear to be a good female character in Monarthrum and Gnathotrichus. The long silky hairs with curved points on the tibia and tarsus of male Xyloterus politus are rather a remarkable and unique sexual character. Frontal elevations, depressions, lines, channels and punctures are good sexual characters in some species, while the same thing is of no value in other species of the same genus. Thus, it will be seen that the external sexual characters are by no means constant among the species, and that it is not safe to conclude that because one species has a well-marked and known male or female external character, that other species belonging to the same genus will necessarily show the same character. It is my opinion that the sexes of no species of Scolytidæ should be characterized without previously dissecting one or more examples of both sexes.

The male genitalia are composed of certain horny parts, the form of some one or more of which is usually characteristic to the nearly related species of a genus, but a wide difference in the form of all of the parts exists in species belonging to different genera. To characterize the different forms by descriptions and drawings will require more time than I have, as yet, been able to devote to this subject. It appears to me, however, that further study in this line is necessary in order to approach anything like a perfect and natural classification of the Scolytidæ, and I hope to be able to contribute additional information upon this subject in the future.

Below, I submit a list of the species I have examined, and give the sexual characters as I have interpreted them. As previously stated, these conclusions are based upon the finding, in individuals of each species, a peculiar structure composed of numerous horny parts, which is evidently the male generative organ. The only room for doubt, in my mind, is in the bare possibility of an ovipositor composed of horny parts being possessed by the female of any of the species. The fact, however, of the numerous examples dissected, where the presence of the ova left no doubt

Digitized by Google

as to the sex, I failed to find anything approaching a horny ovipositor, leads me to believe that the genitalia possessing prominent horny parts are, among Scolytids, found only in the male

The descriptions referred to in the following list, unless otherwise noted, will be found in Rhynchophora of America, north of Mexico, by LeConte & Horn, 1886 :

PLATYPUS.

P. quadridentatus, Oliv. ♂ = description of ♀. ♀ new = description of ♂ *P. flavicornis*, except that the two large punctures each side of the anterior extremity of the short dorsal impressed line, referred to, are not punctures, but smooth, shining and slightly convex spaces.

P. compositus, Say. ♂ = description of ♀. ♀ = description of ♂.

CORTHYLUS.

C. punctatissimus, Zimm. ♂ = description of ♀. ♀ = description of ♀.

C. Columbianus, Hopk. ♂ = description of ♀. ♀ = description of ♂. Proceedings Entomological Society of Washington (not published), also Bulletin 36, W. Va. Expt. Station.

MONARTHRUM.

M. fasciatum, Say. ♂ = description of ♀. ♀ = description of ♂. Additional: ♂: front with coarse punctures; ♀: front with fine punctures, and with slight depression in the middle.

M. mali, Fitch. ♂ = description of ♀. ♀ = description of ♂ except in the long spine referred to, which is not present in any of my examples of either *fasciatum* or *mali*. The long hairs on the club, when adhering, as they often do, resemble a spine. The longest hairs rise from the base of the club on the side next to the head.

GNATHOTRICHUS.

G. retusus, Lec. ♂ = description of ♀. ♀ = description of ♂. Additional: ♂. Club of antennæ with a few short, stiff hairs. No long bristles. Head with a longitudinal elevation in front. ♀. Antennæ with a long bristle rising from the anterior edge of each joint of the funiculus, and the first and second joint of the club; also with a few long hairs, all curving upwards.

G. materiarius, Fitch. ♂ = description of ♀ (?). ♀ new. Antennæ with long hairs and bristles as in *retusus*. Head smooth and sparsely punctured. Additional: ♂. Head with elongated longitudinal elevation in front, ending in an acute point just above base of mandibles.

Digitized by Google

PITYOPHTHORUS.

P. minutissimus, Zimm. ♂ = description. ♀ = description.

P. confinis (?), Lec. ♂ = description of ♀. ♀ = description of ♂.

P. (?) *plagiatus*, Lec. ♂ = description of ♂ in synopsis of the Scolytidæ by Zimmerman, and of ♀ in Rhynchophora by LeConte. ♀ = description of ♀ (Zimm.) and of ♂ (LeConte).

XYLOTERUS.

X. retusus, Lec. ♂ = description. ♀ new. Head convex in front and roughened with minute granules, and with a small depression in the centre.

X. bivittatus, Kirby. ♂ and ♀ = descriptions.

X. (?) (*unicolor*, Eichh.) *politus*, Say. ♂ new. Hind tibia narrower. Anterior edge crooked and near the tip thickly clothed with long, silky hairs with incurving points. Tarsus with fine hairs curved at the points. ♀ new characters. Hind tibia broader. Anterior edge straight, with a few straight bristles. Tarsus with short, straight hairs.

The male of this species was unknown to Mr. Eichhoff when I examined his collection in 1892, as he remarked to me at the time that of the large series of examples he had examined from North America, he had failed to recognize a male. He also admitted that his *unicolor* was evidently the same as Say's *politus*.

The difference in the antennal club, as suggested by LeConte, and the remarkable male character, together with some other differences, demand, I think, that this species should have a distinct genus erected for it.

XYLEBORUS.

X. dispar, Fab. ♂ and ♀ = descriptions.

X. obesus, Lec. ♂ new (?). Length, 2 mm. Width, 1.4 mm.; similar in form to ♁ *X. dispar*, but smaller. Thorax does not project over the head. Head smooth. Elytra distinctly punctured, but not in rows, especially on the side. ♀ = description.

X. xylographus, Say. ♂ new (?). Length, 2 mm. Width, .6 mm. More cylindrical than ♂ of *X. pubescens*. Head punctured in front. Thorax projecting over the head, the anterior portion being slightly rugose, posterior portion smooth. Elytra shining, finely punctured, and with a few granules on the declivity. Body sparsely covered with long, fine hairs. ♀ = description.

I believe this species to be identical with *saxesenii*, Ratz. I can see

Digitized by Google

no difference in the examples collected here and those of *saxesenii* from France and Germany. Their galleries are also of the same character.

X. pubescens, Zimm. ♂ = description of ♂ *pubescens* and *X. perferans*. ♀ = description. Characters variable, and it is my belief that the names of this and a number of other forms of the genus will prove to be synonyms of *X. perferans*, Woll.*

X. fuscatus, Eichh. ♂ new. I do not see sufficient difference between this and the male of *X. pubescens* to distinguish them as separate species. ♀ = description. I think this will prove to be merely a form of *X. perferans*.

DRYOCŒTES.

D. autographus, Ratz. No distinctive external sexual characters were observed in the examples dissected.

D. Eichhoffi, n. sp. ♂. Head more convex in front and with only a few long hairs. ♀. Front slightly depressed and thickly covered with long yellow hairs.

This species resembles *D. autographus* in size and sculpture; the principal difference being found in the secondary sexual characters, which are rather prominent in this species, and obscure in the other. It was determined for me in 1891 by Mr. Eichhoff as a doubtful variety of *D. autographus*, but when I visited him in 1892, and called his attention to the different characters, he admitted that it was a new species, and told me to describe it as such. Therefore, I take pleasure in applying the name which must always be familar to specialists and students in Scolytidæ.

D. granicollis, Lec. ♂, with only a few hairs in front. ♀ with front thickly covered with long yellow hairs.

TOMICUS.

T. calligraphus, Germ. No distinctive external characters observed. The elytra armatures appear to be somewhat more prominent in the male than in the female, but this does not appear to be a reliable character.

T. cacographus, Lec. ♂ with depression in front. Declivity with slightly stronger armatures and longer hairs. ♀ with frontal depression either absent or obscure.

*Mr. Blandford, in a report on the destruction of beer casks in India, has recorded the same as his impression. London, 1893, p. 12.

Digitized by Google

T. pini, Harris. ♂ with frontal tubercle and elytral armatures more prominent. ♀ = description.

T. caelatus, Eichh. No distinctive external characters observed.

SCOLYTUS.

S. quadrispinosus, Say. ♂ and ♀ = descriptions.

S. muticus, Say. ♂ = description of ♀ (?). Head broad and flat in front and thickly fringed with long yellow hairs. Last abdominal segment with two tufts of long hair near the posterior margin. ♀ new. Head narrow, with impressed longitudinal line in front, and with only a few long hairs. Last abdominal segment without tufts of hairs.

S. rugulosus, Ratz. ♂ with head slightly flattened and broader than in ♀, the flat surface bearing a few long hairs. ♀—Head slightly more convex in front, narrower and without long hairs (at least in the examples I have examined).

CHRAMESUS.

C. icoriæ, Lec. ♂ and ♀ = descriptions.

POLYGRAPHUS.

P. rufipennis, Kirby. ♂ head with one and sometimes two acute tubercles in front. ♀ without acute tubercles in front.

PHLOEOTRIBUS.

P. frontalis, Oliv. ♂ and ♀ = descriptions.

HYLESINUS.

H. aculeatus, Say. ♂ = description. The narrow, smooth, longitudinal line referred to is present in both sexes. ♀: front more convex and less pubescent in front.

PHLOEOSINUS.

P. dentatus, Say. ♂ Declivity, with rows of rather prominent tubercles. ♀ Declivity, with rows of granules in place of tubercles.

DENDROCTONUS.

D. terebrans, Oliv. ♂ with only a few short hairs in front. ♀ with numerous longer hairs in front. This character is of little value, however, on account of the liability of the hairs to be rubbed off.

D. frontalis, Zimm. ♂ with frontal channel deeper, and the granulate punctures larger than in female. ♀ Front smoother and more convex.

HYLURGOPS.

H. glabratus, Zett. ♂ with slightly deeper transverse impressions in front, and a longer longitudinal elevated line above base of mandibles. ♀ with frontal transverse line present, but shorter in some individuals, and obsolete in others.

Morgantown, W. Va., August 10th, 1894.

Digitized by Google

PLATYSAMIA COLUMBIA.

BY J. ALSTON MOFFAT, LONDON, ONT.

During the winter of 1891–2, I received from Miss Morton, of Newburgh, N. Y., six cocoons of *P. columbia*, which she had reared from ova, received from one of her correspondents in Ann Arbor, Mich. They were the first cocoons of that moth I had seen. Their extremely small size as compared with *Cecropia*, their natty appearance and dark colour, relieved by flecks of white silk, was quite novel to me, so I frequently showed them to visitors. Amongst these was Mr. R. Elliot, of Plover Mills, one of our members, whose residence is about fifteen miles north-east of London, and whose name is well-known in ornithological circles, but who is rather a "naturalist" than a "specialist;" clear, calm and appreciative in his observations of nature, and thoroughly reliable in his statements. When he looked at the cocoons, he meditatively remarked: "I think I have seen something like that about our place. Indeed, I feel certain I have seen it, but I shall keep a look-out." On the 14th of April, 1894, I received from Mr. Elliot two *P. columbia* cocoons. They were attached to a branch of larch, on opposite sides of the same branch, and one about half its length in advance of the other. The son of a neighbour of Mr. Elliot found one on a tree growing at his house and showed it to Mr. Elliot, who saw it was what he was on the look-out for, so they searched the trees and found more.

The roughened exterior of the cocoons, their dark brown colour, with white markings, give them such a close resemblance to the bark of the branch, that, but for their prominence, they would be extremely difficult to detect, thus forcing on the observer the conviction that larch must be their natural food-plant. On the 3rd of May a male moth emerged from one of the cocoons, and on the 6th a female from the other. On the 5th of May Mr. Elliot gave me another cocoon, which gave forth its imago on the 13th, also a female. The male is three and a-half inches in expanse of wing; the females are four and four and a-quarter. Those from Miss Morton's cocoons are of corresponding dimensions.

Much doubt was entertained when this moth was first discovered, as to whether it was a "species" or a cross between two. This question was conclusively settled when Prof. Fernald published his description of its early stages (CAN. ENT., Vol. X., p. 43). Miss Morton has succeeded in pairing it with *Cecropia*, and she says the progeny "were all

Digitized by Google

barren, and quite different from either parent." When the Professor wrote his description, he was not confident that it was distinct from *Gloveri*. Since then Miss Morton has reared *Columbia* and *Gloveri* side by side, and she says: "The difference between their larvæ is marked in all their stages, whilst the cocoons also differ in size and texture." But she considers *Columbia* to be closer to *Gloveri* than to any other of the genus, and she has had large experience in rearing all of them. It is known by those who have handled them to be an easy thing to separate *Columbia* cocoons from all the other Platysamias, but there seems to be some difference of opinion as to what especially distinguishes the moth from *Cecropia*. That *Columbia* varies somewhat with the locality where found seems certain. The Quebec and Maine forms, as illustrated by Bowles and Strecker, do not strikingly resemble the Michigan specimens, which, Miss Morton says, are quite constant in general appearance. Prof. J. B. Smith states that all the *Columbias* that he has seen are very much alike. I sent a specimen from Miss Morton's cocoons to Dr. Brodie, of Toronto, who has given *Columbia* a good deal of attention, and he said it did not much resemble any *Columbia* he had; and if he had received it without data, he would have pronounced it a diminutive *Cecropia*. This to me was decidedly confusing, and set me wondering if there were no points of difference whereby to separate the two species unmistakably.

When taking a general survey of the two moths, the attention is at once arrested by the smaller size and darker colour of *Columbia*. But there are gradations in these. A very small *Cecropia* is at times obtained. The male from Mr. Elliot's cocoons is extremely dark, whilst a female received from Miss Morton does not perceptibly differ in general shading from some *Cecropias*. So, single specimens could give no certain indication from these differences.

With six authentic *Columbias* before me, and several fresh examples of *Cecropia*, I will take up that part of Prof. S. I. Smith's original description, where he contrasts the two species, and comment upon it in sections.

"This species differs materially from *S. cecropia*. The male has the antennæ, palpi, thorax and legs much darker." Correct, as a rule. "The short grey (or whitish) band on the hind part of the thorax is not found in *S. cecropia*." I have a male *Cecropia* with an indication of it, and in one of the *Columbias* it is not visible. "The discal spots of all the wings are white, instead of dull red with a white centre." In one of the *Columbias*, the spots are quite red. "The transverse bands of both pairs of wings

Digitized by Google

are white, instead of dull red bordered internally with white." Here, I think, we get the most distinguishing point of difference between the two moths. There is no symptom of red in the bands of *Columbia*. The "narrow, white, transverse band," which in some of the specimens would be better termed a line than a band, shades externally into the dark grey of the border, whilst internally it is edged with solid black, which merges into the dark brown of the middle area. This appears to me to be the most conspicuous and constant difference between the two species, and would of itself make it quite easy to separate the moths, regardless of size or depth of colouring. "It wants the broad white band so conspicuous on the anterior border of the secondaries of *S. cecropia*, and also the reddish tints and markings near the apices of the primaries." The band is not so clear a white, or so broad, but is edged with black, which is absent in *Cecropia*; the tints on the apices are a distinction of degree, and but a slight one at that.

"The female differs from that of *S. cecropia* in having the palpi, legs and abdominal rings dark brown, or almost black, instead of dull red." One of the *Columbias* is not distinguishable from *Cecropia* in that respect. "The discal spots of the primaries are linear, obscure and parallel to the transverse band, instead of broad, conspicuous and parallel to the costal border." The spots are more linear, but with a decided tendency toward lunate, thereby being about as much in line with the costal border as with the transverse band. And so far from being obscure, from the absence of red in them they are more conspicuous than in *Cecropia*. There is a male *Cecropia* before me that would answer that description better than any of the *Columbias*. "The discal spots of the secondaries are small and almost round, instead of large and somewhat triangular." No difference except in size, and the absence of red in the spots of *Columbia*. "As in the male, it has the white on the hind part of the thorax, and wants the white on the anterior border of the secondaries, and also the red on the apices of the primaries, on the discal spots, and on the transverse bands." What I have said on these parts of the male answers also for those of the female.

So, then, the only points that are left to me whereby to unmistakably separate *Columbia* from *Cecropia* are the narrow, dull white, transverse band edged internally with black, and the total absence of a red band. These might not separate it from *Gloveri* and *Ceanothi*. I am not familiar with those species.

Digitized by Google

FURTHER NOTES ON SCALE INSECTS (COCCIDÆ).

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

The numbering is continued from page 193.

(13.) *Tachardia cornuta*, n. sp.— ♀ scales crowded on the stems of the plant, lively red-brown in colour, smooth and rather shiny, subtranslucent; elevated so as to form in outline a triangle, the base of which is greater than either side viewed from one side, but with the sides greater than the base when the scale is viewed from one end. In a lateral view the two sides are about equal and meet each other at a right angle; all the other angles of the profile, whether taken from the side or from the end, are necessarily less than right angles.

A more minute inspection shows that the apex of the scale is not a simple pyramid, but consists of a horn or tooth inclined backwards, so that a small but distinct notch appears in the lateral outline on the posterior side. This horn gives the whole scale somewhat the shape of certain teeth of sharks.

Viewed from above, the scale is roughly oval in outline, but presents on each side a slight bulging, before and behind which is a groove or constriction.

Alt. 2, lat. 2, long. 2⅔ mm.

Boiled in caustic soda, the females give a fine bright carmine, like cochineal.

The young are elongate, bright crimson in colour.

Adult female circular in outline. The abdominal process appears to be formed of three segments; the basal one very large, about as long as the breadth of its base; the second much smaller, broader than long; the third or terminal quite small, abruptly truncate. From this terminal portion arise the anal hairs in two bundles of five each; these hairs are of considerable length.

The lateral tubes are elongate, of the peculiar structure usually seen in the genus. The glands are arranged in the tubes so that their proximal outline in mass, viewed laterally, forms a portion of a circle, not a pointed cone as in *T. melaleucæ*.

This lac-insect was discovered by Prof. E. O. Wooton, on a species of Compositæ growing on Little Mountain, on the occasion of a recent meeting of the New Mexico College Field Club. Little Mountain is in the Mesilla Valley of New Mexico, only a few miles from the Agricultural College. Unfortunately the plant was not in flower, and so cannot be

Digitized by Google

identified, but it resembles an *Artemisia*. It grows commonly on the mountains, but although I examined many specimens of it, I failed to find any of the scales, which appeared to be very locally distributed.

From holes in some of the scales, it is evident that the species is attacked by a parasite, but the latter has not been bred.

One other species of *Tachardia* or *Carteria* is known from the arid region, namely, *T. larreæ*, Comstock. I possess a specimen of this, kindly sent to me by Mr. Maskell, and from comparison with this, and a study of Comstock's description and figures, I concluded that my insect was distinct. But to make quite sure, I forwarded specimens to Washington to be compared with Comstock's types of *larreæ*, and Mr. L. O. Howard has very kindly replied as follows :—

"Your new species of *Carteria* differs from *C. larreæ*, Comstock, in the shorter, lateral excretory tubes, the shorter anal cone, and in the smaller number of pores in the four groups back of the anal cone. Each of these groups is composed of from 7 to 9 pores, while in *C. larreæ* they are composed of from 18 to 25 each."

It may be added, that *larreæ* also differs from *cornuta* in not being horned as described above.

The food-plant of *T. larreæ (Larrea)* grows abundantly in the vicinity of Little Mountain, but no *Tachardia* was found upon it.

(14.) *Orthezia annæ*, Ckll.—Prof. C. H. T. Townsend has kindly sent me particulars concerning an *Orthezia* which he found on *Chenopodium* at St. Joe, Arizona, July 20, 1892. I have no doubt that this is *O. annæ*, which was hitherto known only from specimens found on *Atriplex canescens* at Las Cruces, New Mexico. The species was not described until more than a year after Prof. Townsend's Arizona find.

(15.) *Phenacoccus helianthi*, Ckll.—This has so far only been recorded from Las Cruces, New Mexico. On August 25th, last year, I swept some specimens from herbage at El Paso, Texas, but was not able to find the plant they came off. The eggs and newly-hatched larvæ are pale orange.

The following insects prey on *P. helianthi* at Las Cruces :—

(a.) *Hyperaspis undulata*. Numerous, the larvæ covering themselves with white secretion and so simulating coccids. Imago shiny black, with a red spot on the disc of each elytron, and a broadly interrupted pale orange-tinted marginal stripe. Identified by Dr. Horn, who tells me that it has long been known as an enemy of aphides and coccids.

Digitized by Google

(b.) *Leucopis* (near *bellula*, Dr. Riley informs me). A small grey parasitic dipteron.

(c.) *Encyrtus*, sp. (fide Dr Riley). Reddish-ochreous.

(d.) *Tetrastichus*, sp. (fide Dr. Riley) was also bred, but it is a secondary parasite. The species is black with whitish legs and iridescent wings.

(16.) *Dactylopius solani*, n. sp.—♀ about 3 mm. long, sparsely covered with mealy secretion, but without lateral or caudal mealy processes. Colour pale yellowish. Antennæ of the type normal in the genus; 8-jointed, joint 8 elongate, about as long as 6+7; 2 a little shorter than 8, but longer than 3; 7 a little shorter than 3; 5 and 6 equal, a little shorter than 7; 4 shortest; 1 large and broad, about as long as 3; 8 with three whorls of hairs. Formula 82 (31) 7 (56) 4.

In another specimen, joint 8 was distinctly longer than 6+7. In this, also, joints 4, 5, 6 and 7 were about equal. 3 also may be subequal with 2.

Femur ¼ longer than tibia; tibia ⅓ longer than tarsus; trochanter with a long hair; femur stout, with a row of five short but strong bristles on its inner margin, and four (two pairs) on its outer or convex margin. Tibia with five strong bristles on its outer margin, and five or six on its inner margin. Tarsus with four bristles on its outer, and four on its inner margin. Claw stout, slightly curved. Tarsal knobbed hairs slender, with subobsolete knobs.

Mentum apparently 2-jointed. Derm with scattered hairs and round gland-orifices. Rostral loop very short.

Caudal tubercles as usual in the genus, distinct and fairly large, but not elongated, each bearing two hairs of the same size as those on the anogenital ring.

Anogenital ring with either the normal six hairs, or, in some examples, four hairs of the normal size and two small.

On tubers of potato *(Solanum tuberosum)*, at the College Farm, Las Cruces, New Mexico, discovered by Mr. H. H. Griffin. Most of the specimens had been destroyed by parasites, when I received the material at the end of August.

Although we have as yet no definite information beyond that given above, it can hardly be doubted that the species lives naturally on the roots of native Solanaceæ, and has thence spread to the potato, which is not cultivated, except by way of experiment, at Las Cruces. It is ex-

Digitized by Google

tremely probable that the undescribed *Dactylopius* mentioned in Insect Life, iii., pp. 413, 419, as infesting the roots of tomato in New Mexico is the same. Another undescribed *Dactylopius* infests the roots of *Solanum melongena* in Jamaica, and although it certainly resembles *D. solani*, its identity with it cannot be affirmed until adult specimens have been examined. (Entom., 1893, p. 266.)

D. solani is rather an unsatisfactory species to describe, as it possesses just the necessary characters of the genus, neither more nor less. It is thus much like *D. simplex*, Ckll., which lives on leaves of *Pancratium* in Jamaica, but the similarity need not cause confusion, owing to the great difference of habitat. *D. affinis*, Maskell, which lives on potato-tubers in Australia, resembles *D. solani* considerably, but differs in the lateral filaments and in the proportions of the joints of the antennæ.

D. lavandulæ, Signoret, found on roots of *Lavandula* in Europe, differs in the proportions of the antennal joints; and *D. arecæ*, Mask., on roots of *Areca* in New Zealand, will at once be distinguished by the very short second joint of the antennæ. *D. poæ*, Mask., on roots of *Poa* in New Zealand, is quite different from *D. solani*.

At Las Cruces one finds on Compositæ an insect very similar indeed to *D. solani*, which I have described as *Phenacoccus helianthi*. It is distinguished without much trouble by the antennæ, which have 9 joints instead of 8, and by its above-ground habitat. As one contemplates these two insects, it is difficult not to think that we have in *D. solani* a representative of the old stock-form from which *Phenacoccus helianthi* sprung.

(17.) *Diaspis lanatus*, Morg. and Ckll.—This injurious species has, up to the present time, been recognized only in the West Indies and some of the eastern United States. I have now to report it from the other side of the world, namely, Ceylon. Mr. E. E. Green, of Punduloya, Ceylon, lately sent me specimens of what he considered a new species of *Diaspis*, "fatally abundant on cultivated geranium plants," and I can make nothing of it but *D. lanatus*. It similarly infests geraniums (pelargoniums) in Jamaica.

(18.) *Aspidiotus convexus*, Comstock, 1881.—This so-called species, which has been reported from California (Comstock) and New Mexico (Townsend), appears to have no real existence in the form described by its author. The New Mexican form, found on ash in Las Cruces, turns out to be *A. juglans-regiæ* var. *albus*, Ckll. I sent specimens of this to

Digitized by Google

the Dept. Agriculture, remarking at the same time that the relationship between *convexus* and *juglans-regiæ* needed investigation.

Mr. Pergande, when my letter was received, proceeded to look into the matter, arriving at the following remarkable results:—

MR. PERGANDE'S REPORT.

"Prepared a number of females of *A. juglans-regiæ* var. *albus*, and compared them with typical *juglans-regiæ*, but failed to find any structural differences between the two.

"The slides on which Comstock's types of *A. convexus* were mounted are not in our collection, and were probably taken to Ithaca. I prepared, therefore, 13 females, taken from twigs which had been labelled by Comstock *A. convexus*, 'type;' and also 6 females, which had been placed by Comstock in alcohol, while examining the species in California; but, when they were examined under the microscope, it was found that not one of them had any groups of pores, and that they agreed exactly with the description and figure of *A. rapax*.

"To be certain that they really are *rapax*, I prepared also a large number of females, taken from twigs which had been labelled by Comstock *A. rapax* 'type,' and found, after comparing those marked *rapax*, that all of them are absolutely identical.

"Comstock must have made a mistake while describing the two species; he had evidently by mistake taken hold of another species, while working on *rapax*. It is quite possible that his *convexus* is identical with either *juglans-regiæ* or *ancylus*. This point could be settled if Comstock would allow us to examine the slides." (Pergande).

Since *A. convexus* is thus founded on the scale of *rapax* + the ♀ insect of another species, the name must apparently drop. The name "*convexus*" refers to the convex scale of *rapax*, and should be placed in the synonymy of that species—which is itself, according to Mr. Morgan, of Oporto, a synonym of *A. camelliæ* (Boisd).

It is to be observed that in the Dep. Agr. Rep. for 1880 (1881), *A. convexus* is described on p. 295, *A. juglans-regiæ* on p. 300, and *A. rapax* on p. 307. Therefore, those who consider *rapax* distinct from *camelliæ* may have to consider whether the name *convexus*, which has priority of place, should not be preferred for it. On the other hand, if it turns out that *convexus*, apart from the scale, was *juglans-regiæ*, it again has priority of place, should any one care to use the name for a scale which is almost flat.

Digitized by Google

KENTUCKY BUTTERFLIES.

BY HATTIE H. WARNER, LEXINGTON, KENTUCKY.

The following list has for its foundation a collection belonging to the Experiment Station of the Kentucky State College. The diurnal Lepidoptera have not been made the object of special collecting by the Station entomologist, and doubtless a good many species will be added in the future :—

1. *Papilio ajax*, Linn. Common in all wooded regions throughout the State. High Bridge, Nortonville, Clay's Ferry, etc.

2. *Papilio philenor*, Linn. Frequent throughout the State. Bowling Green, Nortonville, Lexington, etc.

3. *Papilio asterias*, Fab. Frequent everywhere in the State.

4. *Papilio troilus*, Linn. Common locally. Specimens from Glasgow, Clay's Ferry, Fulton, etc.

5. *Papilio turnus*, Linn. Very common everywhere. Specimens from Providence, Lexington, Nortonville, Clay's Ferry, etc.

6. *Papilio cresphontes*, Cram. Rather rare. Lexington, Bowling Green.

7. *Pieris protodice*, Boisd. and Lec. Common some seasons, generally rare. Lexington.

8. *Pieris rapæ*, Linn. Very common everywhere.

9. *Nathalis iole*, Boisd. Very rare.

10. *Callidryas eubule*, Linn. Rather common locally in Western Kentucky.

11. *Colias cæsonia*, Stoll. Lexington. Not common.

12. *Colias philodice*, Godt. The most abundant butterfly of Kentucky. Occurs in large swarms about damp sand in the latter part of summer.

13. *Terias nicippe*, Cram. Common everywhere in lowlands. Lexington, Nicholasville, Bowling Green, High Bridge, etc.

14. *Terias lisa*, Boisd. and Lec. Found only occasionally. Specimens from Glasgow.

15. *Danais archippus*, Fab. Common everywhere.

16. *Argynnis diana*, Cram. Very rare. A specimen was collected by Prof. H. Garman, at East Cairo, several years ago.

17. *Argynnis cybele*, Fab. Common about thistles in summer.

18. *Euptoieta claudia*, Cram. Common in fall all over the State. Lexington, Bowling Green, East Hickman.

Digitized by Google

19. *Melitæa phaeton*, Drury. Moderately common in June. Pineville.

20. *Phyciodes nycteis*, Doubleday and Hewitson. Moderately common everywhere. Specimens from Lexington, Pineville, Brooklyn Bridge.

21. *Phyciodes tharos*, Drury. Very common all over Kentucky. Seen from May through the season.

22. *Grapta interrogationis*, Fab. One of the most abundant butterflies of Kentucky.

23. *Grapta comma*, Harr. Rather rare. Specimens from Lexington.

24. *Grapta progne*, Cram. Rather rare. Specimens from Clay's Ferry.

25. *Vanessa antiopa*, Linn. Not common, most often seen in the fall.

26. *Pyrameis atalanta*, Linn. Frequently seen throughout the State. Specimens from Lexington.

27. *Pyrameis huntera*, Fab. Rather common. Specimens from Lexington, East Hickman and Bryant.

28. *Pyrameis cardui*, Linn. Common everywhere.

29. *Junonia cœnia*, Hubn. Occasional in Eastern Kentucky. Common in western part of State, along the Ohio River. Specimens from Glasgow and Fulton.

30. *Limenitis ursula*, Fab. Frequently seen during the latter part of summer. Specimens from Glasgow, Lexington, Pineville, East Hickman.

31. *Limenitis disippus*, Godt. Not very common. Specimens from Lexington, Glasgow and Tyrone.

32. *Apatura celtis*, Boisd. and Lec. Common everywhere. Specimens from Lexington and Fulton.

33. *Apatura clyton*, Boisd. and Lec. Occasional. Specimens from Lexington, Fulton and Tyrone.

34. *Paphia troglodyta*, Fab. Occasional in Eastern Kentucky. Common locally in Western Kentucky. Found at Lexington, Hopkinsville and Glasgow Junction.

35. *Debis portlandia*, Fab. Moderately common in Western Kentucky. Specimens from Aden Springs and Fulton.

36. *Neonympha gemma*, Hubn. Occasionally seen. Specimens from Fulton.

37. *Neonympha eurytris*, Fab. Rather common in open woods. Specimens from Nortonville, Midland and High Bridge.

38. *Neonympha sosybius*, Fab. Common everywhere in woodland. Specimens from Fulton.

Digitized by Google

39. *Satyrus alope*, Fab. Common in mountains of Eastern Kentucky. Specimens from Midland.

40. *Libythea bachmani*, Kirtland. Occurs throughout the State. Common in Western Kentucky, along the Mississippi and Ohio Rivers.

41. *Thecla halesus*, Cram. Lexington.

42. *Thecla humuli*, Harr. Rather rare. Specimens from High Bridge and Fulton.

43. *Chrysophanus hypophlæas*, Boisd. Frequent. Specimens from Lexington.

44. *Lycæna pseudargiolus*, Boisd. and Lec. Frequently seen. Specimens from Lexington and Pineville.

45. *Lycæna comyntas*, Godt. Common everywhere. Specimens from Lexington and Pineville.

46. *Ancyloxypha numitor*, Fab. Abundant everywhere along streams.

47. *Pamphila zabulon*, Boisd. and Lec. Brooklyn Ferry and Lexington.

48. *Pamphila huron*, Edw. Common some seasons in Eastern Kentucky. Specimens from Lexington and Bowling Green.

49. *Pamphila otho*, Smith and Abbott. Rare; one specimen from Glasgow Junction.

50. *Pamphila peckius*, Kirby. Very common everywhere. Seen in June and July.

51. *Pamphila cernes*, Boisd. and Lec. Common throughout the State. Specimens from Lexington, Glasgow, etc.

52. *Pamphila verna*, Edw. Rare, only one specimen in the collection.

53. *Pyrgus tessellata*, Scudd. Common everywhere throughout the State.

54. *Nisoniades martialis*, Scudd. Rare, only one specimen, from Nortonville.

55. *Pholisora catullus*, Fab. Common throughout the State.

56. *Pholisora hayhurstii*, Edw. Not very common. Only one specimen, from Bryant, Kentucky.

57. *Eudamus pylades*, Scudd. Not very common, a single specimen from Brooklyn Bridge.

58. *Eudamus bathyllus*, Smith and Abbott. Rather rare. Specimens from Glasgow and Bowling Green.

59. *Eudamus lycidas*, Smith and Abbott. Rather rare. Specimens from Glasgow Junction.

60. *Eudamus tityrus*, Fab. Common throughout the State.

Digitized by Google

A FEW REMARKABLE VARIATIONS IN LEPIDOPTERA.

BY GEORGE A. EHRMANN, PITTSBURGH, PENN'A.

Papilio turnus, ♀, Linn.—I received a curious example of a ♀ *P. turnus*, which has the outer margin greatly produced towards the apex of the primaries; the secondaries are more rounded and not so elongate as in the typical form; and the black discal bars are broader and more suffused. The expanse is only 3¾ inches, thus giving the insect a very odd appearance. My specimen was taken in Westmoreland County, Pa. Dr. Holland has an example, taken in Coalburgh, W. Va., that agrees in every respect with mine.

P. turnus, dim, form *Glaucus*, Linn.—This singular specimen is of the *turnus-glaucus* form, but the right-hand primary is almost as light and boldly marked as the typical *turnus*. I have also an example that is as dark as the darkest forms of *glaucus* and has no trace of yellow in it except on the underside of the right-hand primary, where there are many large, light, yellow blotches, that seem to have been put there artificially. There is another in my collection that has little or no trace of yellow on the forewings, but the discal band of secondaries is nearly as boldly marked with yellow as in *turnus*.

P. asterias, Fabr.—Out of a batch of about forty larvæ that I succeeded in rearing, and carried through the winter of 1892–3, I obtained five fine examples, four males and one female, that have no pupil-spot in the ocellus. There were no two larvæ in this batch that were alike, even at the same stage of existence.

Leucarctia acræa, Drury.—♂. Same as the typical form, except that the black spots on the right-hand primary, between the median nervures, have blended into one another, thus forming three black bars. This curious example was caught flying around the electric lights of our city, in the latter part of June, 1893. The black bars are half-an-inch long, and give the moth a very singular appearance.

Leucarctia acræa, Drury, var. *Klagesii*, Ehrmann.—♂. Upper surface of primaries has no black spots whatever, except three small ones on the median portion of the costa, and six exceedingly minute black points on the outer margin. On the secondaries there is a faint black discal spot, and two on the outer margin, one near the apex and one near the inner angle. All these spots are almost obsolete, thus making this an interesting form, and giving it the beauty of having clear white primaries,

Digitized by Google

and almost immaculate orange secondaries. On the under surface of both pairs of wings the markings are the same as above, but the ground colour of the wings is much lighter than usual, and is of a lovely lemon yellow; the abdomen, thorax, head, antennæ and legs are the same as in the typical form.

Of this form, I have seen several examples in various collections, and I believe that it is a sufficient variation to have at least a name of its own. I therefore claim the pleasure of dedicating this pretty form to the memory of my deceased friend, Frederick W. Klages, who was preparing for a second collecting trip to Jamaica, when he was taken ill and died.

PARTIAL PREPARATORY STAGES OF HEMILEUCA CALIFORNICA, WRIGHT.

BY G. H. FRENCH, CARBONDALE, ILL.

The eggs are sub-globular, between that and sub-quadrate, shaped much like *Luna* and its allies; length, .06 inch; width, .06 inch, by .05 inch in height; smooth, the apex flattened, but the base rounded. Colour, olive green; those on one side of the twig, red tinted. They were placed round a twig of food plant (willow) with one of the long ways across the twig. They were from California, and where deposited about the last of October. As they hatched the middle of the following April, this would give six months as the duration of this period.

Young Larva.—Length, .12 inch. Sub-cylindrical, largest at the anterior end. Body black, or, we might say, orange-black; each joint with six fleshy, cylindrical tubercles, nearly as long as the diameter of the body, from each of which arise two white hairs. Head black; venter, legs and anal segment orange. Duration of this period, 8 days.

After 1st moult.—Length, .16 inch. Shaped as before. Uniform brownish-black, the tubercles and all; hairs grayish-white. Duration of this period, 11 days.

After 2nd moult.—Length, .25 inch. Of a uniform black, about the same shade as before; the two dorsal rows of tubercles orange with black bases, those on the posterior part of the body with the black extending well up on the tubercle, two pale hairs for each tubercle.

During this period all died. Though I had several thousand of them, I failed to get any past the third moult. They were extremely gregarious in their feeding, huddling together on the food plant, and moving but little.

Digitized by Google

NOTES FROM MY DIARY, QUEBEC, 1893.

BY A. W. HANHAM, WINNIPEG, MAN.

On August 10th, I left by the 4.45 p.m. ferry for the Isle d'Orleans, which was reached about 5.30. A short walk uphill brought me to one of my favourite collecting grounds, and the remaining daylight was usefully spent looking for Coleoptera, a few good things being taken.

About dusk I visited a patch of the spreading Dog-bane (*Apocynum androsæmifolium*, Lin.), which was in bloom, growing at one end of a small clearing in the woods; a road ran alongside the fence at this end, on the other side of which was more wood. The evening was clear, with somewhat of a warm breeze. Here, in half-an-hour, I captured eight species of Plusia, over 30 specimens. I was kept busy netting and bottling my captures. Things were so numerous that several entomologists could have found a lively and profitable thirty minutes' occupation; unfortunately, I had to tear myself away at 8 o'clock, to catch the boat.

When I got home, I found the following to be the contents of my bottles: *Plusia putnami*, Grt., 4; *thyatiroides*, Gn., 1; *U-aureum*, Bdv., 1; *mortuorum*, Gn., 6; *viridisignata*, Grt., 1; *ampla*, Walk., 1. The balance consisted of *precationis*, Gn., and *simplex*, Gn. The only other noctuid taken at this blossom was *Drasteria erechtea*, Cram., rather common. I may add that before dusk I took a fine *Plusia bimaculata*, Steph., on the wing.

BOOK NOTICES.

RANDOM RECOLLECTIONS OF WOODLAND, FEN AND HILL; and WOODSIDE, BURNSIDE, HILLSIDE AND MARSH, by J. W. Tutt, Editor of the Entomologist's Record and Journal of Variation. London: Swan, Sonnenschein & Co.

The name of the author of these two volumes must be familiar to our readers, as an occcasional contributor to our pages, while he is widely known as a writer of much scientific repute on matters concerning the Lepidoptera. In these two books he has assumed a lighter and more popular role; his aim has been—to quote his own words—"to bring under the notice of the general public, in readable and untechnical language, a few of the interesting phenomena which are to be observed everywhere around us, by those who take the trouble to look for them, and to give such explanations of their causes as may easily be understood, even by those whose scientific knowledge is small." He has cer-

Digitized by Google

tainly carried out his design most successfully, and given to the world two very charming and interesting books on out-of-doors Natural History. Anyone, whether young or old, who takes any pleasure in the beauties of nature, and any interest in the varied world of animal and vegetable life, will read them with the greatest delight, and follow the author with unflagging interest, during his rambles over hill and dale, and by marsh and burn and fen. In the former work, more attention is paid to the habits and variations of insects, while the latter treats of any animal or plant that may be met with in expeditions to widely different localities. Amusing episodes and pretty bits of verse enliven the volumes, and many capital pictures render the later one still more attractive.

REPORT OF THE ENTOMOLOGICAL DEPARTMENT OF THE NEW JERSEY AGRICULTURAL COLLEGE EXPERIMENT STATION, by John B. Smith, Sc. D., for the year 1893.

It is obviously impossible to notice all the ever-welcome bulletins and reports that constantly flow from the various Experimental Stations throughout North America, for copies of which we are very grateful to their authors. We may, however, call attention to Dr. Smith's excellent departure from the ordinary report. After giving the usual general review of the season, and an account of the most important insect attacks of the year, he devotes a large portion of his work to a most useful and admirable account of the "Beneficial Insects," in all the different orders. It is clearly and plainly written, so as to be within the comprehension of non-entomologists, and is profusely illustrated with excellent figures, many of them being new productions by means of photography. It ought to be widely distributed, in order to teach the general public that a very large proportion of insects are not noxious, and should not be wantonly destroyed.

CORRESPONDENCE.

INSECTS AT LIGHT.

Sir,—That light is one of the greatest attractions to the Insect World has never been so forcibly demonstrated to me as this summer. In the eastern part of the City of Cleveland, and situated near the Garfield Memorial, are the immense car barns of the C. E. R. Co., one of the street railways of this city. One of these buildings, with a breadth of one hundred feet and a length of over three hundred feet, is painted white on

Digitized by Google

the inside. At night it is illuminated both inside and out with electric arc lights. The walls, I should judge, are about thirty feet in height. Situated as these buildings are, near the cemetery, some parts of which lie untouched by the hand of man, being in a truly primeval condition, you can see at once that the place is exceedingly favorable to the entomologist. It seems that these white walls, together with the electric lights, form a moth trap which no entomologist could improve. The ends of the building are, of course, left open. This place is a veritable fairyland for the entomologist. During a storm insects of all kinds will fly in, and are easily captured. Among the Lepidoptera which I have taken are the following: *Attacus luna*, *A. Cecropia*, *A. Polyphemus*, *A. Promethea*, *Eacles imperialis*, *Saturnia Io*, *Arctia acrea;* over twenty different species of Hawk moths, and many others too numerous to mention. As I am only collecting Lepidoptera, I have not paid much attention to the other orders of insects. The Coleoptera are also very abundant.

Before I close, I may speak of *Argynnis aphrodite*, which I never saw so common before. On going into a meadow a dozen will fly up at your approach, while they are over everything and everywhere. Never here have I seen a butterfly in such numbers.

GEO. L. LEE, Cleveland, Ohio.

ATTACUS PROMETHEA.

Sir,—Having noticed Mr. Moffat's communication regarding *Attacus promethea* in the August number, it occurs to me that the following may prove of interest. On June 10th, while in Milton, Mass., I placed two females in a box on the piazza for assembling. About 3 o'clock in the afternoon a male was observed flying around the house. He was captured, and a short time later another appeared. They kept coming at intervals until about half-past five, and after that none were seen. There were ten in all, of which number eight were perfect. On the next day, at about the same time, they began to come again, but very much more numerously. At the end of the afternoon, twenty-nine had been taken, besides a large number which were not collected, because of imperfections. The moths were not seen either night. The next day no more moths put in their appearance, and the females were removed. Besides this occasion, I have several times seen the male moths flying around, when there were no females in the vicinity. I have never seen the females fly by day, however, or the males except between three and six o'clock. It seems to me that *Promethea* is habitually a day flyer, but I have never seen any other of the Saturniidæ on the wing during the daytime. All the males which assembled showed the same apparent blindness which Mr. Moffat speaks of.

JAMES A. FIELD, Milton, Mass.

Mailed October 5th.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, NOVEMBER, 1894. No. 11.

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

V. The Coccinellidæ of Ontario and Quebec.

This family includes a moderate number of beetles, usually of compact, convex and often more or less hemispherical form, coloured as a rule in striking patterns of yellows or reds and black. In most cases the surface is glabrous, though in *Scymnus* and some less extensive genera it may be plainly pubescent. Technically, the family may be known by the clavate antennæ, the three-jointed tarsi with dilated second joint and the partially membranous dorsal abdominal segments; the ventral segments are free, the first usually with coxal lines, and the claws ordinarily appendiculate or toothed. It will, however, seldom be necessary to recur to these characters in the study of a limited fauna such as is presented by East Canada, as the facies is usually such as to render the fact of an insect belonging here unmistakable. Sexual characters are feeble and seldom used in specific or generic determinations.

The larvæ are common on leaves of plants, and may often be seen in numbers on twigs infested with aphides, which constitute the chief food of the more northern species, although *Epilachna borealis* (Fig. 35), which occurs farther to the south, is known to be phytophagous in habit. Most of the known North American larvæ of this family agree in being of somewhat elongate form, often quite spiny and usually spotted or banded in reds, black and yellows. They bear a resemblance to a minute alligator in shape, and are known under that name by children in some parts of the country. When full fed the larva attaches itself by the anal extremity to some convenient surface—the under side of a leaf or the bark of a tree in wild countries—and transforms to a pupa (Fig. 36—pupa of *Coccinella 9-notata*), displaying the characteristic gaudy colours before mentioned, the old larval skin adhering to the posterior extremity.

Fig. 35.

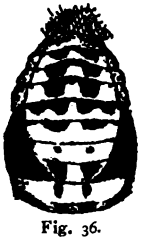


Fig. 36.

The genera are extremely difficult to tabulate in a

Digitized by Google

satisfactory form, and I have been unable to find easily seen characters in all cases—partly because of the extreme resemblance in form among certain genera, and partly on account of the wide variation in colour shown by a few species precluding much use of this in a table. In part, I have followed the "Classification," while in other places I have used more readily perceived characters, which, while not in themselves of true generic value, will nevertheless allow the species here treated to be properly placed. The interpretation of specific characters is, in general, after the "Revision of the Coccinellidæ of the United States," by Mr. Crotch, although he has not tabulated most of them. *Scymnus* is omitted for the present.

A word of caution is necessary to beginners. Some of the species are very closely allied, and often so variable in colour, especially as regards the greater or less development of the elytral spots, that they may prove extremely puzzling, and in order to avoid mistakes the tables and descriptions, which have been made fuller than in preceding papers of this series, should be carefully studied. The considerable number of figures offered should also prove an aid to accurate work.

The species known from our region may be placed in their approximate genera by use of the following key:

A. Body pubescent.

Antennæ reaching base of thorax; body oblong-oval... *Coccidula.*

Antennæ scarcely as long as the head; body nearly hemispherical..... *Scymnus.*

AA. Body glabrous, base of antennæ covered by a frontal plate, thorax very small; upper surface black, elytra each with one red spot..... *Chilocorus.*

AAA. Body glabrous, base of antennæ exposed, thorax of moderate size.

b. Form oblong-oval or elongate, ventral lines absent or nearly so.

c. Elytra with sutural and discoidal black stripe..... *Næmia.*

cc. Elytra spotted.

d. Thorax distinctly margined at base. ..... *Megilla.*

dd. Thorax not margined at base.

Small (.13 in.). Elytra each with eight spots,* sometimes confluent..... *Anisosticta.*

Larger (.20—.30 in.). Elytra with not more than six spots* on each..... *Hippodamia.*

*The common sutural spots excluded.

Digitized by Google

bb. Form usually rounded and much more convex; metasternal and ventral coxal lines distinct.

e. Antennæ longer (sometimes only slightly so) than the head; form looser, less contractile; colour above usually pale with dark markings.

f. Size small (.08 to .10 in.).....*Psyllobora.*

ff. Larger (.16 to .38 in.).

g. Antennæ only slightly longer than the head, elytral epipleuræ not extending to tip.

Lines on first ventral angulate externally.....*Coccinella.*

Lines on first ventral semicircular, complete .....*Adalia.*

Lines on first ventral incomplete externally.....*Harmonia.*

gg. Antennæ longer, extending at least to middle of prothorax; epipleuræ entire.

Claws bifid, body oval, more convex.....*Mysia.*

Claws toothed, body rounded in outline, less convex.....*Anatis.*

ee. Antennæ extremely short, about as long as the front; body compact, strongly retractile; colour above black, with yellow or red markings.

Anterior tibiæ with a strong spine on the outer edge, elytral spots more numerous. *Brachyacantha.*

Anterior tibiæ simple, elytral spots fewer in number.....*Hyperaspis.*

ANISOSTICTA, Duponchel.

A. strigata, Thunb., which represents the above genus in the Canadian fauna, is a small ovate or somewhat elongate insect (.13 in.), black beneath excepting the sides and tip of the abdomen, which, with the legs and antennæ, are yellow. Above, the head is yellow anteriorly, the thorax yellow, with two triangular black spots, the apices of the triangles being applied to the base. These spots are sometimes irregularly v-shaped, or the outer limb of the v may even be separated as a spot. Elytra yellowish, with a common bilobed spot on the scutellar region, and usually eight others on each, black; these spots may, however, be confluent in a varying degree, so as to form a less number of larger size.

Digitized by Google

NÆMIA, Muls.

To this genus belongs *N. episcopalis*, Kirby, a small species (.15 in.) of more than usually elongate and parallel form, black beneath, with the legs and sides of the abdomen yellow. Above, the head and prothorax are black with yellow stripes, the elytra yellow with a narrow common black sutural vitta, and on each a broader discoidal one; none of these reach the apex.

MEGILLA, Muls.

The well-known *M. maculata*, DeGeer, is of an oval, not very convex form, black beneath, the prosternum and a row of triangular lateral abdominal spots reddish. Above, reddish, with large black spots as follows:—Two large black sub-triangular on the prothorax, one diamond-shaped on the scutellar region of the elytra, one transversely elliptical on the suture about three-fourths to tip; each elytron has in addition four spots (the second the largest) arranged longitudinally near the external edge. Legs black, head black with a triangular frontal spot prolonged on to both sides at the broad end. Length, .20 to .22 in. (Fig. 37.)

Fig. 37.

HIPPODAMIA, Muls.

The species are rather numerous and vary to a considerable extent in the size of the elytral black spots. The thorax has a pale border and often two white dashes on the disk.

A. Tibiæ black.

b. Thoracic border sinuate or interrupted. Discal marks absent, or nearly so.

Basal elytral spots large, usually connected so as to form a transverse band. Length, .25–.27 in. . . *5-signata*, Kirby.

Basal elytral spots small or wanting, .28–.30 in. *Lecontei*, Muls.

bb. Thoracic border nearly uniform, disk with two white dashes.

Elytral spots small, never united, .18–.20 in. . . *convergens*, Guer.

AA. Tibiæ pale.

Thorax with quadrate yellow spot at middle of base, .16–.20 in. . . . . *parenthesis*, Say.

Thorax without spot at base, .20–.24 in. . . . *13-punctata*, Linn.

Fig. 38 is a diagram of *Hippodamia 5-signata;* Fig. 39—A the larva, B the pupa, and C the imago of *H. convergens;* Fig. 40 *H. parenthesis;* Fig. 41 *H. 13-punctata.*

Digitized by Google

Fig. 38.

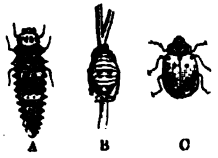


Fig. 39.

Fig. 40.

Fig. 41.

COCCINELLA, Linn.

A number of species of very convex form constitute this genus; they vary, as do those of *Hippodamia*, in the extent of the black markings, but may be separated thus:—

A. Elytra red, immaculate. White margin of thorax with three branches..... *sanguinea*, Linn.

AA. Elytra reddish or yellowish with black markings.

b. Thorax with anterior margin white.

Elytra with three black transverse fasciæ, sometimes reduced or partially divided, .22 in..... *trifasciata*, Linn.

Elytra with a common scutellar, and each with four other spots, black, the two anterior smaller, .26–.30. *9-notata*, Hbst.

bb. Thorax with anterior angles only white.

c. Elytra strongly punctulate, shining; thorax with anterior angles triangularly white. Elytra each with a triangular subapical black spot and a common black sub-basal fascia tridentate anteriorly, .19 in..... *tricuspis*, Kby.

cc. Elytra alutaceous, obsoletely punctulate. Thorax with a quadrate white spot on the anterior angles above.

Anterior thoracic angles only narrowly white beneath. Sub-basal spots of elytra usually united into a common fascia, .28–.30 in..... *transversoguttata*, Fabr.

Anterior thoracic angles as broadly white beneath as above. Elytra without sub-basal band, usually with an oblique medial fascia, a scutellar spot and a subapical spot on each, .28–.30 in.... *monticola*, Muls.

Of the above species, *C. tricuspis* is unknown to me in nature. Figures are given of *C. sanguinea*, Fig. 42; *C. trifasciata*, Fig. 43; *C. 9-notata*, Fig. 44, and its larva, Fig. 45, and pupa, Fig. 36; *C. transversoguttata*, Fig. 46; and *C. monticola*, Fig. 47.

Digitized by Google

Fig. 42.

Fig. 43.

Fig. 44.

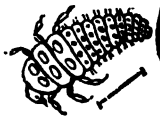


Fig. 45.

Fig. 46.

Fig. 47.

ADALIA, Muls.

Two species are found in the Canadian lists ; they are similar in outline to *Coccinella*, but less convex. Being very variable in colour, they are likely to make trouble, but may be separated thus :—

Elytra uniform yellowish red or with transverse fasciæ of small black spots in varying number, .18 in..... *frigida*, Schn.

Elytra yellowish-red with a rather large discoidal black spot, .19 in..... *bipunctata*, Linn.

Elytra black, humeral angles, or entire basal region, and a smaller post-median spot red..... var. *humeralis*, Say.

HARMONIA, Muls.

The species of Harmonia are very troublesome to define by description, but are comparatively easily recognized after a short acquaintance. *H. 12-maculata* is easily known by its convex form and resemblance in coloration to *Megilla maculata*, while the oblong-oval form and peculiar markings (see Fig. 48) of *H. picta* render the more typical specimens easily known. *H. 14-guttata*, while of somewhat the same form as *21-maculata*, may be easily separated from it by the dark ground colour with lighter markings. The differences may be stated, then, as follows :—

Fig. 48.

Elytra testaceous or pinkish, with large black spots ; one common scutellar, one common at about three-fourths, and, on each elytron, one humeral, two medial, one post-medial, and one triangular apical. Thorax with two very large black spots. Form hemispherical, .22 in..... *12-maculata*, Gebl.

Elytra light red with pale spots, or black with red spots, normally seven on each, but sometimes reduced to two. Punctuation unequal. Thorax with front and hind margins pale, often also with a medial line and spot near the hind angles, .23 in... *14-guttata*, Linn.

Digitized by Google

Elytra entirely pale or with a longitudinal line, and a spot on each side (the spot often confluent with the line) dark or black. Prothorax pale, with black spots often coalescing into an **M**-shaped mark, with a dot on each side, or varying infinitely in size and shape. Form oblong-oval, less convex, .17 in.....*picta*, Rand.

MYSIA, Muls.

M. pullata, Say. Oval, convex, head black with two yellow frontal spots, thorax black with narrow whitish front margin, sides broadly white and enclosing a black spot. Elytra reddish, sometimes with an irregular blackish dorsal vitta. Legs usually black, .28 in. Larger than *Coccinella sanguinea*, which it recalls at first sight, and with the thorax differently marked.

ANATIS, Muls.

Two species are recorded from Canada, differing thus :—

Elytra very distinctly punctured; thorax yellowish white, with a heavy, more or less **M**-shaped discoidal black mark, and a black marginal spot near the hind angles. The elytra are usually yellowish with black spots, arranged in three transverse rows, though occasionally specimens are found in which the elytra are brown or nearly black. Legs wholly or in part yellow, .30–.38 in. (Fig. 49).....*15-punctata*, Oliv.

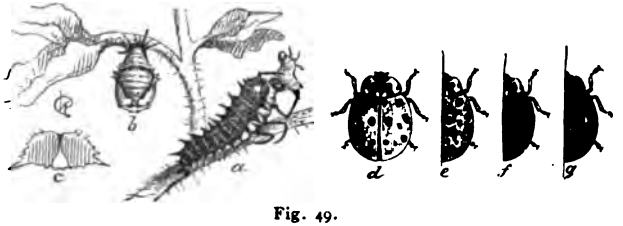


Fig. 49.

Elytra quite smooth, with oblong piceous spots, variable in form and extent, so that nearly the entire disk may become piceous, enclosing small yellow stripes or blotches.....*subvittata*, Muls.

The former is our largest Coccinellid, and is easily recognized. The latter I am unacquainted with, and owe the characters on which the separation is made to the kindness of Dr. Horn.

PSYLLOBORA, Chevr.

A small, yellowish-white species (*P. 20-maculata*, Say.), only .08 to .10 in. in length, with numerous black spots; cannot be mistaken for anything

Digitized by Google

else, since it is the only black-spotted Coccinellid of such small size and hemispherical shape in the Canadian fauna.

CHILOCORUS, Leach.

Fig. 50.

C. bivulneratus, Muls., is the only Canadian species. It is a rounded, very convex species, with a very short thorax and wide margins to the elytra, which are black, with a red discoidal spot. The abdomen is red. Length, .20 in. Fig. 50, imago; Fig. 51, larva.

Fig. 51.

BRACHYACANTHA, Dej.

One species comes from our region, *B. ursina*, Fabr., a rather small, oval convex insect (my specimens varying from .09 to .16 in. in length), black above, head yellow, the thorax with front margin yellow in the male. The elytra are black, with five yellow spots, one humeral, one basal, two medial and one sub-apical. The variety *10-pustulata*, Melsh, includes the small specimens in which the head is often black, with an orange spot on the vertex.

HYPERASPIS, Chevr.

Resembles *Brachyacantha* in form, but differs in having no spine on the anterior tibiæ. The ornamentation in the Canadian species is also usually less profuse.

A. Elytra black, with marginal spots or lateral stripe and a discoidal spot before the middle yellow. Sides of prothorax (in ♂ the front margin and head also) yellow, .08–.10 in..... .....*undulata*, Say.

AA. Elytra black, without series of lateral spots or stripes.

b. Prothorax black (♀), with sides and front margin pale (♂).

Elytra black, each with a rounded red spot at about the middle, and sometimes another small one near the tip, .09–.16 in.....*signata*, Oliv.

bb. Prothorax with lateral spot or margin pale in both sexes, ♂ with head pale.

Fig 52.

Elytra each with a round spot at middle and two small ones (sometimes wanting) one-fifth from the tip, sides of prothorax yellow; ♂ with front margin and head also yellow, .08–.12 in.....*proba*, Say.

Elytra each with a round red spot near the tip, thorax with a large lateral spot, .11–.12 in.....*bigeminata*, Rand.

Fig. 52 represents *H. undulata*.

Digitized by Google

COCCIDULA, Kug.

A single species is known, *C. lepida*, Lec., about .12 in. in length, pubescent, and of rather elongate form. My specimens are yellowish above, the head black, except at sides. Elytra with a broad black common sutural stripe, dilated at apex and extending three-fourths to tip. At base this stripe is also dilated, and extends across to the sides, where it becomes confluent with a broad, black lateral vitta, which runs beyond the middle. Beneath, mostly black, the legs, sides of prothorax and four terminal abdominal segments yellow. Antennæ longer than usual, yellow.

The remaining Provinces of Canada, after excluding Ontario and Quebec, seem to have furnished comparatively few additional species of Coccinellidæ; the few published records that I am able to find (excepting *Scymni*) are appended.

Ceratomegilla ulkei, Cr. Hudson's Bay. "Oval, subopaque, antennæ and tarsi ochreous; head with a white spot in front of each eye, thorax bordered with ochreous on the sides, anterior angles broadly ochreous, and a very minute line in the middle of the anterior margin also ochreous; elytra rather closely punctate, a triangular spot on the base, the external margin irregularly, and an elongate common sutural spot near the apex fulvous. L., .22 in." Unknown to me.

Adonia constellata, Laich. Nova Scotia. "Black, tibiæ, antennæ and entire front of head pale; thorax with a narrow border, abbreviated medial line connected with the anterior margin, and a round dot on either side, white. Elytra with a scutellar spot, and six others (as in *Hippodamia*) variously united or absent." L, 19 in.

Eriopsis connexa, Germ. Vancouver. "Oblong, black; thorax with the sides and a spot on the front and hind margins yellow. Elytra with the base, margin and two dorsal spots yellow; the marginal line is dilated in five places, one basal, one subhumeral, one medial, one at three-fourths and one sub-apical. L., .22 in."

Hippodamia moesta, Lec. Victoria, Van. Isl. (var. of *Lecontei*). Elytra entirely black, with a small basal dot near the scutellum and a triangular marginal subapical spot, yellow. L., .29 in.

Digitized by Google

H. falcigera, Cr. Slave Lake, Hudson's Bay. Black, head with a small yellow frontal spot; thorax without discal marks, with a narrow uniform yellow border. Elytra yellow, with the suture black (narrowing out before the apex), and each with a black, equally broad vitta, suddenly incurved before the apex. L., .22 in.

H. americana, Cr. Hudson's Bay. Tibiæ pale, metepimera black, thoracic margin narrow in front, broader and emarginate at sides, sutural vitta suddenly dilated at one-third. L., .20 in.

Coccinella transversalis, Muls. Victoria, Van. Isl. A variety of *C. transversoguttata*, in which the basal band is divided, or only the scutellar spot left. It, therefore, resembles, superficially, *C. monticola*, from which it may be separated by the thoracic spot, as shown in the preceding table.

Anatis Rathvoni, Lec. Nanaimo, Van. Isl. (Holland). May be known from *A. 15-punctata* by the black meso-and metepimera.

Psyllobora tædata, Lec. Victoria, Nanaimo, Van. Island. Smaller than *P. 20-maculata*, spots mostly brown, sub-confluent, punctuation fainter.

The more essential bibliography of this family is not extensive, but in part very difficult to procure. The following are the principal titles:—

1850. Mulsant. Species des Coleopteres trimeres securipalpes. Ann. Soc. d'Agric., Lyon, Ser. II., 1850. Supplement Ann. Soc. Linn., Lyon, Ser. III., 1853. Additions et rectifications, l. c., Ser. II., 1856.

1852. Le Conte. Remarks upon the Coccinellidæ of the United States. Proc. Acad. Nat. Sci., Phila., Vol. VI.

1873. Crotch. Revision of the Coccinellidæ of the United States. Trans. Am. Ento. Soc., IV.

1880. Le Conte. Short studies of North American Coleoptera. Trans. Am. Ento. Soc., VIII. (p. 186, *Hyperaspis*).

PHILAMPELUS ACHEMON.

While collecting on the 29th of last June, at an electric light on the outskirts of Toronto, in company with Mr. H. R. Hayter, he captured a ♀ specimen of *Philampelus achemon*, Drury. The insect had lost one antenna, but was otherwise in perfect condition. I have not heard of any other capture of this insect near Toronto.

G. M. STEWART, Toronto.

Digitized by Google

ON THE LARVÆ OF TWO SPECIES OF ARACHNIS.

BY HARRISON G. DYAR, NEW YORK.

The larvæ of two species of Arachnis, from Mexico, were given to me by Mr. Jacob Doll. They are the following :—

Arachnis aulea, Geyer.

Egg.—Shape of two-thirds of a sphere, with flat base. Shining, pearly, iridescent. Diameter, .6 mm. The reticulations are rounded, moderately distinct, of quite uniform size, but smaller at apex. On the angles of the reticulations a series of short, stiff spines (½inch objective).

First stage.—Head bilobed, the lobes full, rounded ; clypeus large, mouth projecting. Colour shining, blackish, ocelli black, mouth brown ; width, .3 mm. Body, pale whitish-brown, shading into a milky colour dorsally. Warts small, black, hairs single from i. and ii. on joints 5-12, several from a wart on the others, pointed and very minutely spinulose. Cervical shield, thoracic feet and the abdominal ones outwardly, black.

Second stage.—Hairs more numerous, several from each wart, black, bristly. Width of head, .4 mm., colour shining black. Body pale chocolate-brown, with a diffuse darker sub-dorsal band, and very faint narrow, pale dorsal line. Warts black.

Third stage.—Head shining black ; width, .6 mm. Body dark blackish-brown, with a flesh-coloured, narrow, dorsal line. Warts black ; hairs of different lengths, stiff, more abundant at the extremities than centrally, with a few long, white ones anteriorly. Slight white lines above warts iii. and iv.

Fourth stage.—Dorsal space on joints 6-10 marked with brick-red around wart i.; dorsal line very narrow, pale ; lateral white lines obscure. Hair on joints 2-5 and 11-12, more abundant and longer than centrally ; black, the subventral hairs white. Width of head, .9 mm.

Fifth stage.—Head rather square, black ; width, 1.2 mm. Body all black, with a narrow red dorsal line. Warts and thoracic feet shining. Hair black at ends, foxy-red centrally, the long anterior and posterior hair and most of the subventral ones pale, nearly white.

Sixth stage.—Head as before ; width, 1.9 mm. Body black, immaculate, the warts shining ; abdominal feet light reddish. Hair bristly, pointed, foxy-red, mixed with black, with a few long and pale ; subventral hair indistinctly paler than the rest. Spiracles small, white.

Digitized by Google

Seventh stage.—Head black, reddish at vertex; width, 2.5 mm. Body as before, but the central lateral warts are brownish. Subventral hair scarcely paler.

Eighth stage.—Black, the warts brown; hair largely black, but still partly foxy-red. Abdominal feet dull crimson; spiracles reddish. Width of head, 3.4 mm.

Ninth stage.—Hair all black, body sooty black, warts light-brown, spiracles white. Thoracic feet black, abdominal ones dull crimson. Head black, labrum and antennæ pale; width, 4.5 mm. When full fed the larva hybernated until the folllowing June. It then spun a large transparent double cocoon of soft silk, mixed with a few hairs, and the moth emerged in July.

Arachnis suffusa, Schaus.

Egg.—Nearly spherical, but with flattened base, somewhat conoidal; diameter, .6 mm. Colour fleshy yellowish with a pearly-bluish lustre. Magnified 50 diameters the surface is covered with large shallow pits with ill-defined edges, not sharp enough to form reticulations.

* * * * *

Second (?) *stage.*—Head very pale yellowish, shining; the cluster of large ocelli black, mouth brown, a blackish shade at vertex; width, .6 mm. Warts quite large, but concolorous and inconspicuous, the hair bearing tubercles only black. Colour pale greenish-yellow, with a faint white dorsal line. Cervical shield small, lens-shaped, brownish. Warts ii. and iii. on joints 3, 4 and 12 tinged with dark orange. Hair fine, not abundant, brownish.

Third stage.—As before; width of head, 1 mm. Traces of a black subdorsal line. Hair more abundant, mostly short, white, but mixed with a few very long hairs, some of which are black. Feet colourless.

Fourth stage.—Head bilobed, brownish-yellow, ocelli black, mouth brownish, jaws black; width, 1.45 mm. Body rather sordid green, the thoracic segments, and an area around wart iii. on joint 12, shaded with orange; feet and venter whitish. A narrow, defined, white dorsal, lateral and substigmatal line, the lateral shaded above and below with black dottings, and enclosing the warts of row iii. Warts large, concolorous, the hair granules black. Hair long, stiff and straight, but fine, spinulose, white and black intermixed. Some hairs 8 mm. long. Length of larva, 15 mm. Line of tracheæ evident.

Digitized by Google

Fifth stage.—Head concealed beneath the hair of joint 2, pale brownish; width, 2.2 mm. Dorsal space whitish-gray, dorsal line white, narrow; lateral space dark greenish-gray, pale at the extremities; subventral space greenish with sordid white subventral line. Warts large, pale, the hair granules black, row iv. slightly orange, distinctly so anteriorly and posteriorly, especially on joint 12. Hair long, bristly but fine, abundant, black and white.

Sixth stage.—Head partly retracted below joint 2, its suture well-marked; orange-ochraceous, labrum and bases of antennæ yellow; width, 3 mm. Body gray, punctured and wrinkled with intermixed mottlings of fine white streaks and minute black dots. A poorly defined white dorsal line containing minute black dots; subdorsal line obsolete, but its location marks a boundary, where the colour becomes darker gray laterally. Warts i.-iii., pearly gray, like the body, wart iv., orange. A bright yellow, broad substigmatal line; wart v., slightly orange; vi., whitish with yellow bases. Thoracic feet coloured like the head, abdominal ones slightly orange-tinted. Hair dense, of quite even length, pointed, bristly, heavily spinulated, black and white about evenly mixed, though there is considerable variation in this respect in different larvæ, some having the hair nearly all black. From the thoracic segments and joints 12-13, a few white hairs of great length (15-17 mm.). General appearance neat, silvery-gray. When full fed, the larvæ spun slight cocoons and hybernated in them. Changed to pupæ the following spring, and the moths emerged in June.

SHALL WE USE THE NAME EUDRYAS?

BY A. R. GROTE, A. M., BREMEN, GERMANY.

So far as I have present references Berg is the first to use again the term *Euthisanotia* for *Eudryas unio* and allies in his paper on Argentine moths. Berg's species is, however, as I have shown, not congeneric with *unio*, but belongs to my genus *Copidryas*. More recently Neumoegen & Dyar use *Euthisanotia* and cite Boisduval's *Eudryas* as a synonym. The facts appear to be these. Hübner, in his Zutraege, 3rd Hundred (N. & D. call it "Vol. III."), p. 12, No. 216, fig. 431–2, describes and illustrates *Euthisanotia unio* for the first time. He calls it a Noctua. In the

Digitized by Google

same Hundred (1825), a few pages further on, 39, No. 295, he describes Cramer's *timais* and refers it as congeneric with *unio*. His genus *Euthisanotia* thus comprises *unio* and *timais*. *Timais* was almost certainly autoptically unknown to Hübner when he wrote the Verzeichniss; he figures it in the Zutraege on account of Cramer's defective figure (unrichtiges Bild). In the Verzeichniss Hubner refers *timais* to *Xanthopastis*, and this course leads Berg to suggest that this latter term should be used for *timais*. Evidently in the Zutraege Hubner corrects this reference, and, in effect, *Xanthopastis* is really a synonym of *Polia*, Hubn. The European species of *Polia* show yellow dottings *(flavicincta)*, and hence Hubner's generic name. Cramer's figure of *timais* shows the yellow dottings of this species. Hubner lays his greatest stress on markings and colour, and so, in the Verzeichniss, Cramer's species is catalogued with the European "*Poliæ*." Boisduval, in 1836, found thus two species of *Euthisanotia*, 1825. He took *unio* of the two generically dissonant species as the type of his new genus *Eudryas*. Was he free to do so? Does the fact that Hubner figures first (p. 12) *unio*, and then (p. 39) *timais*, make *unio* the type of *Euthisanotia*? Or, is *Euthisanotia*, 1825, a mixed genus?

The rule, as I understand it, with regard to mixed genera, is that the succeeding authority may take any of the species as the type of the new genus, unless the original type is actually designated. This is not the case with Hubner's genera, except by inference in the Tentamen, where only one species is given, which is, of course, the type. This makes the Tentamen so valuable. It is now generally known that Ochsenheimer and Treitschke's genera are only catalogue names, and catalogue names for such mixed assemblages that the "type" is difficult to decide. But the Tentamen often gives us the key, by showing us the species for which such names as *Agrotis*, *Apatela*, *Polia*, etc., were originally intended. It is an error to assume that the first species in any of the Verzeichniss genera is the type. In seeking for the type, the student must study all subsequent authorities to find out all restrictions of the original term. Such restrictions of the original generic title for a mixed genus have the force of priority and must be respected. A short and easy way is to refer to the original and take the first species as the type of a mixed genus, but this is a rough and insecure method. In my Buffalo List I have given some results of my studies as to a few of the older Noctuid genera, and these results, where my facts cannot be disputed, must be respected.

Digitized by Google

The question as to *Eudryas* is rendered difficult by Hubner's separation of the species by several pages, but virtually it seems to me we have to do with a mixed genus. For the use of *Eudryas* for the type *unio*, we have, then, Boisduval, Harris, Packard, Walker and myself. For the use of *Euthisanotia* for *timais*, we have the British Museum Catalogue and my own writings.

Upon a related point, I would say that it is now held generally by European classificators that a change in a new specific or generic title itself or its limitation by an author in the same work or book, or, if a serial, in the same series of papers, or year or volume, must be respected. This would cover Guenée's changes of specific names in the Species Genéral. We must therefore write *Orthodes enervis*, *Catocala viduata*, etc. To this extent at least authors may correct their original publication. There will be no valid objection then to the latter name *Orthosia euroa*, G. & R. This reading would inferentially show that Hubner's reference of *timais* to *Euthisanotia* is sufficiently valid for its use as the type of the genus under Boisduval's restrictive action in 1836. We may therefore continue, I think, to use *Eudryas* for *unio* and congeneric species.

The question, I have admitted, is a difficult one, and the view I here take of it may be thought not entirely uninfluenced by my respect for the nomenclature of Harris's Insects Injurious to Vegetation. It is true I am unwilling to lose *Eudryas* from our lists; but, if the case was quite clear, I should not be free to object. I desire also to show that questions as to generic types are not always easy to solve; they demand some thought, some study beyond the mere reference to a page in some book. In the present case Hubner's prior reference of *timais* to *Xanthopastis*, Verzeichniss, 1818, adds to the difficulty. I think it not uninteresting to have followed Hubner's action with regard to *timais*. Evidently the yellow dots in Cramer's figure led him to believe he had to do with a foreign species of *Polia*. Afterwards, when he recognized Cramer's species in nature, he was evidently disappointed, and wished to correct the generic position of the moth. And, in his new reference, he is equally out of the way; perhaps, indeed, his second mistake is greater than the first. Here again it is the gay colours of *timais* that make him associate it with *unio*. Both are odd-looking moths, having a differing, while equally strange beauty. The notion that in *unio* and allies we have to do with aberrant

Digitized by Google

noctuids is not confined to Hubner. The form, the discal spots on primaries, the simple antennæ make the view plausible, so that, not so long ago, Moeschler is of this opinion. I may remark that I have never seen so pale a specimen of *timais* as that figured by Hubner. The pretty pink of the Spanish moth (which comes up to us in the Middle States from the South, blown against our light houses along the coast) has all faded out on Hubner's plate. Are there two species as suspected by Gueneé from alcoholic larvæ? My first specimen of *timais* was given to me by my old friend, Mr. W. H. Edwards, and I fell a victim to its attractions to the extent of redescribing it. If I had then conceived my theory of the migration of moths during the summer, following the gulf stream and the prevalent direction of the wind, from south to north, I should not have made my mistake. While Dr. Thaxter shows that *timais* breeds in Florida, it is still a tropical Gortynid form and contrasts with the rest of our North American Noctuidæ, which generally favour the European type.

NOTES ON SOME SOUTH-WESTERN HEMIPTERA.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In the CANADIAN ENTOMOLOGIST, 1892, pp. 193–197, the writer published some notes on New Mexico Heteroptera and Homoptera. The notes on the fifty-three species in the present paper are additional and complete the list, so far as the names can be obtained, of all the Hemiptera collected by the writer in New Mexico and Arizona.

In seven cases there are no localities attached to the species. This is because the numbers of those species were returned to me in such confusion by Dr. Skinner that they can not be connected with the data referring to them.

It should be mentioned that the Homoptera and Heteroptera are not separated in the list, but are arranged together in alphabetical order.

Acanonia bivittata, Say.—Grand Canon, Arizona. Hance trail. July 8 and 11, 1892. Two. Det. Uhler.

Agalliastes sp.?—Soledad Canon, Oregon Mts., N. Mex. May 23, 1891. One. A small black capsid, with extremity of wing covers glassy. Eyes red. Det. Uhler.

Digitized by Google

Anasa tristis.—Las Cruces, N. Mex. July and August. Very numerous on college farm, causing death of squash plants. Also received from Eddy, N. Mex.

Anasa Uhleri, Stal.—Las Cruces, N. Mex. Often mistaken for the squash bug, *A. tristis*. Det. Uhler.

Apiomerus spissipes, Say.—Las Cruces, N. Mex. Several. Det. Uhler and Riley.

Brochymena annulata, Fab.—Las Cruces, N. Mex. Several specimens. Det. Riley.

Brochymena obscura, H. Schf.—Las Cruces, N. Mex. May 12. On *Prosopis juliflora*, on mesa. One. Det. Uhler.

Bythoscopus pallidus, Fitch.—Det. Uhler.

Campylenchia curvata, Fab.—Det. Uhler.

Capsid (new to Nat. Mus. Coll.)—Continental Divide, Tenaja, N. Mex. August 2, 1892. Two. Det. Riley.

Chelinidea vittigera, Uhler.—Grand Canon, Arizona. Hance trail. July 10. One. Det. by comparison.

Cicadula, sp.—Eddy, N. Mex. Sept. 1, 1891. Received specimens of this leaf-hopper from Mr. F. E. Downs, with report that they were doing much injury to potato vines. It is a small species, much resembling the vine *Typhlocyba*, and is about 3½ mm. long. Det. Riley.

Clastoptera delicata, Uhler.—Det. Uhler.

Compsocerocoris annulicornis, Proct.—Det. Uhler.

Conorhinus, sp.—Los Palomos, N. Mex. June 14, 1892. One. A dark-brown reduviid. Det. Riley.

Corimelaena extensa, Uhl.—Cedar Ranch, Arizona. July 6, 1892. On *Nicotiana*, sp. (See Psyche, 1893, pp. 547–548.)

Coriscus ferus, L.—Las Cruces, N. Mex. May 9 to 28, 1891. Many swept from alfalfa. A small grayish reduviid-like species. Det. Uhler.

Corizus hyalinus, Fab.—G Bar Ranch, Zuni river, Arizona. July 27, 1892. One. A *Nysius*-like heteropter. Det. Riley.

Cydnus (?) *obliquus*, Uhler.—Grant County, N. Mex., (W. J. Howard, 1882). Two. Det. Riley.

Darnis, sp.?—Las Cruces, N. Mex. Det. Uhler.

Diplodus luridus, Stal. Det. Uhler.

Digitized by Google

Euschistus fissilis, Uhler var.—Las Cruces, N. Mex. May 8 to 12, 1891. On alfalfa. Det. Uhler.

Euschistus servus, Say.—Grand Canon, Arizona. Hance trail, part way up towards the rim. July 8 and 12. Two. Det. Uhler. Las Cruces, N. Mex. July 8, 1891. One on cabbage on college farm. Reported to occur occasionally on cabbages. Det. Riley.

Gargaphia opacula, Uhler.—Las Cruces, N. Mex. July 16, 1891. A single adult, with a large number of young, of this small grayish species was taken on under side of leaves of very young egg plants. The plants were badly infested with the young, and showed abundant evidence of their work. Det. Uhler. This species was described by Mr. Uhler in his report on the Heteroptera of the Death Valley Expedition, from one specimen from the Argus Mts., California. Mr. Uhler examined the Las Cruces (adult) specimen in 1892, before receiving the Death Valley material, but did not venture to describe it at that time from the single specimen.

Geocoris punctipes, Say.—Las Cruces, N. Mex. May 9 to 28, 1891. On alfalfa. Some are almost black, but are determined by Mr. Uhler as same. A pair *in coitu* of lighter ones, May 28. Det. Uhler.

Hadronema, sp.—Cocanini Plateau, Arizona. Twelve miles north of Cedar Ranch, on road to Grand Canon. July 6, 1892. Two beaten from *Atriplex canescens*, with *H. militaris*. This is a larger species than the latter. Det. Riley.

Hadronema militaris, Uhl.—Cocanini Plateau, Arizona. Twelve miles north of Cedar Ranch, on road to Grand Canon. July 6, 1892. Several specimens beaten from *Atriplex canescens*. Det. Riley.

Harmostes propinquus, Stal.—Las Cruces, N. Mex. Det. Uhler.

Harmostes reflexulus, Say var.—Las Cruces, N. Mex. May 28, 1891, One swept from alfalfa. A green reduviid-like species. Det. Uhler.

Lameria collaris, Uhler.—Grand Canon, Arizona. Hance trail. July 8. One. A very small bluish species, with pale yellowish face and sternum. Eyes black, wings bluish. Det. Uhler.

Largus cinctus, H. Schf. var.—Las Cruces, N. Mex. Common. Det. Uhler.

Digitized by Google

Lioderma congrua, Uhl.—Las Cruces, N. Mex. May 8, 1891. Two adults of this fine green species on alfalfa. July 16, 1891. One taken on cabbage on college farm. Det. Uhler. On Nov. 13, 1892, there was taken on *Salix longifolia* in Alameda, a specimen very similar to this species, but distinct. It may be *Thyanta custator*, F., but is much lighter green.

Lyctocoris campestris, Fab.—Las Cruces, N. Mex. (?). Number lost, which makes the locality doubtful. Det. Riley.

Lygaeus bistriangularis, Say.—Chaves, N. Mex. August 6, 1892. One. Det. Riley.

Lygaeus Kalmii, Stal.—Las Cruces, N. Mex. Det. Uhler.

Lygaeus reclivatus, Say.—Las Cruces, N. Mex. July 8, 1891. On squash on college farm. Previously taken on various plants, mostly on flowers of *Aster spinosus*. Belen, N. Mex. August 7, 1892. One. Grant Co., N. Mex. (W. J. H.), One. Det. Riley.

Melanocoryphus facetus, Say.—Las Cruces, N. Mex. May 8, 1891. One on alfalfa. May 23, one on ground in Soledad Canon. May 24, one on ground on plain to east of Organ Mts. Det. Uhler and Riley.

Membracid.—Cocanini Plateau, twelve miles north of Cedar Ranch, Arizona. July 6. A long-horned tree-hopper found in numbers on the stems of *Ridellia tagetina*. They doubtless suck its juices.

Metapodius granulosus, Dallas.—Soledad Canon, Organ Mts., N. Mex. May 23 and 24, 1891. Three inside head, at bases of leaves of a century plant (*Agave*), up a north side branch of the Canon. The *Agave* was probably *A. Parryi*. Det. Uhler.

Murgantia histrionica.—Las Cruces, N. Mex. Numerous in July on Chinese cabbages on college farm. Eggs and newly hatched young observed July 16.

Narnia femorata, Stal.—Grand Canon, Arizona. Hance trail. July 10. Three. Det. Uhler.

Narnia pallidicornis, Stal.—Las Cruces, N. Mex. One. A grayish-brown bug resembling *Leptoglossus*. Det. Riley.

Digitized by Google

Nezara marginata, Beauv.—Grand Canon, Arizona. Hance trail. July 11 to 12, 1892. A bright green pentatomid. Found in numbers on the thin green pods of *Cercis occidentalis*, a round-leafed leguminous tree. From 2,000 to 3,000 feet below the rim. They were found only on this tree, and doubtless pierce the pods. Adults and nymphs. Det. Uhler.

Notonecta mexicana, Amyot.—Grand Canon, Arizona. Hance trail. July 8 to 11. Common in the stream. Larvæ and nymphs also taken. Det. Uhler.

Oecleus decens, Stal.—Las Cruces, N. Mex. Aug. 19. One on stalk of *Helianthus annuus*. Aug. 21, one on *Xanthium* leaf. Det. Uhler.

Ormenis pruinosa, Say.—Grand Canon, Arizona. Hance trail. July 8. One. A grayish-brown homopter. Det. Uhler.

Phymata Wolffii, Stal.—Las Cruces, N. Mex. Common. Also Grand Canon, Arizona. Hance trail, near rim, July 11 and 12. Det. Uhler.

Resthenia sp. ?—Soledad Canon, Organ Mts., N. Mex. May 23, 1891. Four specimens on thistle, mostly on the flowers. A beautiful black and deep red capsid. The antennæ were missing, which made the determination uncertain. Det. Uhler.

Salda interstitialis, Say.—Det. Uhler.

Scolops sp. ?—Las Cruces, N. Mex. A long-horned tree hopper. On herbage. Det. Uhler.

Spilalonius geniculatus, Stal.—Grant County, N. Mex. (W. J. H.). One. A pale-coloured diplodid. Det. Riley.

Stiretrus anchorago, Fab. (Nymph).—Las Cruces, N. Mex. August 19, 1891. Several nymphs of this pentatomid taken on *Helianthus annuus*. The nymph is jet black, with a large red spot. The larvæ are almost wholly black. No adults. Det. Riley.

Thyanta custator, Fab. and var.—Las Cruces, N. Mex. Nov. 13. One. A light green pentatomid, with five very faint orange flecks on each edge of abdomen. Det. Riley.—Var. Las Cruces, N. Mex. May 8, 1891. One on alfalfa. Wholly of a clear light green. Det. Uhler.

CORRIGENDA.

Page 251, line 21 from top, for "Limer," read, Zimm.

Page 254, line 25 from top, "One of the types of this species," should precede, "*B. fumatus*," etc., as it refers to *B. punctatissimus*.

Page 256, line 16 from top, for "(rods)," read, pods.

Page " line 3 from bottom, for "back," read, bark.

Digitized by Google

NOTES ON NOVA SCOTIAN DRAGONFLIES.

BY PHILIP P. CALVERT, PHILADELPHIA, PA., AND WILLIAM SHERATON, TORONTO.

(In 1889 and 1890, Mr. William Sheraton, of Wycliffe College, Toronto, collected some Odonata at Pictou, Nova Scotia, for me. At the end of the collecting season of 1889, he sent me a letter containing his field notes on the specimens captured. These observations are so interesting, in my opinion, that any publication in which they appear ought also to bear Mr. Sheraton's name as joint author. He has kindly acceded to my wish in this respect, although modestly protesting that his part has "been only such as any child could have done." All notes in the present paper concerning localities, habits and dates are to be credited to Mr. Sheraton, while I am responsible for the determinations and the few bibliographical notes. With the exception of *Aeschna constricta*, none of the species mentioned below had been recorded from Nova Scotia previous to Mr. Sheraton's taking them, although I have since cited the locality, for some of the species, in various papers—P. P. C.)

The dragonflies which I obtained in Pictou were, with few exceptions, from three localities, (1) a small, shallow, weedy pond in an open field—"Simpson's pond"; (2) a small, boggy brook, full of rushes, etc., in a back pasture (marked on envelopes, "Brook north of Priest's Barn," or "Mr. Simpson's back pasture"); (3) a much larger and deeper pond, surrounded on every side but one with a thick second growth of spruce (marked "Pond on Back Road near the 'Boar's Back"). Most of the kinds I got were found in all three localities, but they all appeared to have some preference in the matter.

Lestes unguiculata, Hagen. Pasture, Aug. 21, 1889.

Lestes uncata, Kirby (*hamata*, Selys, 1862.) June 19, 1889, common about Simpson's Pond and the boggy brook, and I think were also found at the larger pond, although I have not recorded the capture of any specimens there. July 23, 1889, the pasture; also 1890.

Enallagma ebrium, Hagen. Exceedingly abnndant from the beginning (June 19, 1889) to the end of the season in the first locality, and quite abundant also about the boggy brook, particularly in the earlier part of the summer, and at points where it broadened into small pools with more or less open water. They were also abundant at the larger pond by the Boar's Back (a great ridge of gravel, running for some miles

Digitized by Google

through the country, and apparently the shore of a now vanished lake) on the one occasion on which I was able to visit it, July 23.

Cordulegaster diastatops, Selys. One male, June 24, 1889, brook.

Aeschna constricta, Say. Two males, July 26, 1889; one female, Sept. 2, 1889, may belong here or to the next species. First noticed towards the end of June, and during the remainder of my stay in Pictou was frequently seen everywhere, often far from water, but was difficult to catch. Two of the specimens I sent you were captured in rather unusual ways. One I knocked down with a stick, as I was walking along the road one evening, and I picked him up before he succeeded in picking himself up. The other alighted upon me one morning when I was standing on a ladder untying a clothes line, in such a way that when I lowered my arm (quite unconscious of its presence) it was held securely between my arm and my side. This latter occurrence seemed to me rather indicative of stupidity in the insect, other specimens of which I have known to fly almost in my face when I was not endeavoring to catch them. On the other hand they "dodged" the net with great skill, and on one occasion having found two hovering over a brook, at which I had seen them, when without a net, some hours before, having captured one, I made an unsuccessful sweep at the second, which had flown away a short distance on my scooping in the first, and then returned, when it flew straight away from the brook and did not return, at least to that part, although I waited for some time.

Aeschna clepsydra, Say. Three males, July 26, 1889. All my three specimens were taken at the deep pond near the Boar's Back, but I think I have also seen them in other localities, and flying about the country like the preceding species, from which it is, when on the wing, to me, indistinguishable at a short distance. (Two of these males are cited in a paper on this species in *Ent. News*, Vol. V., p. 11.)

Somatochlora Walshii, Scudder. One female, July 23, 1889. I found one female laying her eggs in a little bit of open water, so surrounded and overarched by rushes that her movements were much restricted. (This female, which still remains the only known individual of its sex, has been described by the first of the two authors of the present paper in Trans. Am. Ent. Soc., xvii., p. 33, 1890, with a supplementary note in *Ent. News*, iii., p. 23, 1892.)

Libellula quadrimaculata, Linné. One female, July 24, pasture; two males, one female, July 26, 1889, Abundant in all three localities, but

Digitized by Google

about the shallow pond I never succeeded in catching a single specimen. They "dodged" every time. I captured one which had alighted on a stump near the boggy brook, but as I was taking it out of the net it grabbed my finger savagely, whereat I was so taken aback that I let him slip from my fingers, when he, of course, lost no time in "making himself scarce." After this I made many vain attempts to capture specimens of this kind, but got none. On visiting the pond near the Boar's Back, however, I succeeded in capturing three, stealing up and sweeping them in suddenly when they were close under the steep bank at one side of the pond. Five males, one female, 1890—pond half a mile east of Boar's Back, July 12.

Leucorhinia proxima, Calvert. Two males, July 26, 1889. I saw none, to my knowledge, away from the pond by the Boar's Back, where the two specimens I sent you where taken. (These were two of the types of the original description of this species in Trans. Am. Ent. Soc., xvii., p. 38, 1890.) One male, 1890.

Leucorhinia hudsonica, Selys. One male, one female, June 25, 1889; I never saw any but the two specimens I sent you, which were taken in locality No. 2. (These two were the types of what was too hastily baptized *Leucorhinia Hageni*, n., sp., with the first of us as sponsor, in Trans. Am. Ent. Soc., xvii., p. 36, Jan., 1890, and as promptly buried in *Ent. News*, i., p. 73, May, 1890. If there were any hopes of a revivification, it is only necessary to add that in July, 1890, on the occasion of a visit to Cambridge, Dr. Hagen and myself compared this couple with types of *L. hudsonica* in the Museum of Comparative Zoology, and satisfied ourselves that they were specifically identical.)

Leucorhinia intacta, Hagen. Six males, July 12, 1890—pond half a mile east of Boar's Back.

Diplax rubicundula, Say. June 25, July 24, Aug. 21, 1889.

Diplax obtrusa, Hagen. July 24, 1889.

(Mr. Sheraton's notes refer to these two very similar species together.) No. 7 (specimens of *D. rubicundula* taken June 25) was abundant in all three of the places in which most of my collecting was done, but especially so about the boggy brook, where I first saw it. They were easily caught. They had a curious habit of rising suddenly from the weeds about the brook, flying along a short distance not far off the ground, and then alighting upon it like a locust. The likeness to the latter insect in so doing was much increased by their size, colour, and by their flight, which

Digitized by Google

was slow and unsteady for a dragonfly. (The colours of the specimens taken June 25 are pale, indicating recent transformation, a condition which explains the peculiarities of the flight).

Kind No. 10 (older individuals of *D. rubicundula* and *D. obtrusa*) did not appear until late in July, but speedily became very abundant, and during the last part of the summer was by all odds the most common species, even outnumbering the little *Enallagma ebrium* at Simpson's Pond. The back of the abdomen of this species in life was of a brilliant red.

It may be well to add, by way of postcript, that the species of Odonata, other than those named above, which have been recorded from Nova Scotia are, with the original place of record :—

Lestes disjuncta, Selys, Bull. Acad. Roy. Belg. (2), XIII., p. 303, 1862.

Gomphus parvulus, Selys, Bull. Acad. Roy. Belg., XXI., pt. 2, p. 56, 1854 ; in his Monog. Gomph., p. 158, 1858, the locality is given as based on "un male dans la collection du British Museum."

Cordulegaster maculatus, Selys, Bull. Ac. Roy. Belg. (2), XLVI., p. 690, 1878 (Cape Breton).

Somatochlora elongata, Scudder. *saturata*, Hagen (no descr.), Syn. Neur. N. A., p. 138, 1861, "Selys' collection," Selys, Bull. Ac. Belg. (2), XXXI., p. 293, 1871, cites the Nova Scotian specimen as in the British Museum.

Somatochlora forcipata, Scudd. *chalybea*, Hagen (no descript.), Syn. Neur. N. A., p. 138, 1861, "Selys' collection".

Somatochlora tenebrosa, Say. *tenebrica*, Hag. (no descr.) Syn. Neur. N. A., p. 138, 1861, "Selys' collection".

Tetragoneuria semiaquea, Burm. Hagen, Proc. Bost. Soc. N. H., XVIII., p. 61, 1875, "Selys."

Cordulia Shurtleffi, Scud. *bifurcata*, Hagen (no descr.), Syn. Neur. N. A., p. 137, 1861, "Selys' collection".

Leucorhinia glacialis, Hagen, Trans. Am. Ent. Soc., XVII., p. 234, 1890, (Cape Breton).

The precise localities are not given in these records quoted.

There is much reason to think that the Odonate fauna of Nova Scotia embraces many more species than the twenty-two known at the present time to inhabit the Province.

Digitized by Google

A STUDY OF THE GENUS MENISCUS.

BY G. C. DAVIS, AGRICULTURAL COLLEGE, MICH.

*Synopsis of species.**

Abdomen entirely black or with white margins of segments.
Femora rufous or honey yellow.
Antennæ with yellowish annulus..... *Bethunei*, CR.
Antennæ without yellowish annulus.
Areolet present.
Abdominal segments without white margins.
Pleuræ more or less rufous, yellow spots before and beneath tegulæ ..... *scutellaris*, CR.
Pleuræ black, a yellow spot before and beneath tegulæ ..... *superbus*, PROV.
Pleuræ black, without spot before or beneath tegulæ ..... *parva*, CR.
Abdominal segments margined with white... *pulcherrimus*, CR.
Areolet wanting.
Mesothorax more or less rufous..... *ostentator*, n. sp.
Mesothorax black and yellow..... *mirabilis*, CR.
Femora black, areolet present..... *Slossonæ*, n. sp.
Abdomen rufous, black at base.
Areolet present, antennæ without annulus.
Posterior femora black with yellow markings..... *elegans*, CR.
Posterior femora rufous..... *comptus*, n. sp.
Areolet wanting, antennæ with white annulus.. *Michiganensis*, n. sp.
Abdomen black, banded with yellow at base of segments..... *Johnsonii*, n. sp.

MENISCUS OSTENTATOR, n. sp.

♀. Length, 7 5 mm.; ovipositor, 7 mm. Black, polished; with orbital lines from occiput to middle of eyes in front, cheeks, clypeus, mandibles except tip, palpi, gula, cuneiform lines on mesonotum, tegulæ, spot in front, lines beneath extending irregularly back to posterior coxæ, sides of scutellum, line on lower pleuræ between anterior and middle coxæ, prosternum, anterior coxæ, middle and posterior coxæ except a black dash above and large spot inside, all the trochanters except black

**Meniscus Ashmeadii*, PROV., and *M. marginatus*, PROV., belong to *Pimpla annulipes*.

Digitized by Google

base, posterior tibiæ except black annulus near base and black extremity, and tips of the abdominal segments beyond the first, yellowish-white. Remainder of legs fulvous, with a black spot at the base of all the femora and an annulus near the tip of the posterior femora; tarsi dusky. Antennæ long, slender, black. Wings hyaline, without areolet. Mesosternum and meso-and metapleuræ rufous. Metanotum smooth, oval, coarsely punctured, with one small circular transverse carina near the abdomen. First segment of the abdomen shining, 2 and 3 finely punctured. ♂ with the abdomen as in the ♀. The head is yellow except the central part of the vertex and occiput, which are black. Pronotum and a spot on the front edge of mesonotum, black; remainder of mesonotum rufous, with yellow markings as in the ♀; scutellum, pleuræ and venter, yellowish-white. Antennæ reddish-brown, with scape beneath yellow. Legs same as in ♀ except more yellow.

Described from 3 ♀ ♀ and 1 ♂ taken at the Michigan Agricultural College.

MENISCUS SLOSSONÆ, n. sp.

♀. Length, 12 mm.; ovipositor, 8 mm. Black, with lemon-yellow markings as follows: orbits, two more or less united longitudinal stripes on the front, cheeks at base of mandibles, mouth except tip of mandibles, tegulæ, minute spot beneath and dash in front, sometimes wanting, V on scutellum, post-scutellum, central spot on metanotum, tips of abdominal segments 1, 2 and 3, and sometimes base of the first. Legs yellow, with all the coxæ, and posterior legs with first joint of the trochanter, femora except tip and base, tibiæ except base, and tarsi, black. Antennæ black. Apex of wings infumated; areolet large, petiolate. Thorax and head coarsely and closely punctured, metanotum rough. Abdomen shining, smooth.

Described from 3 ♀ specimens collected at the top of Mount Washington, N. H., by Mrs. Annie Trumbull Slosson, to whom I take pleasure in dedicating this species.

MENISCUS COMPTUS, n. sp.

♀. Length, 8 mm.; ovipositor, 6 mm. Black, with abdomen beyond second segment rufous. Orbital lines nearly enclosing base of antennæ, face, except three short black dashes just beneath antennæ, mouth, gula, nearly all of prothorax, tegulæ, line beneath, long line in front confluent with triangular spot on mesonotum, spot in front of scutellum, scutellum

Digitized by Google

except a small wedge in front, post-scutellum, a large irregular diagonal spot on mesopleura, spot beneath posterior wing, circular spot just back and above, semicircle around insertion of abdomen with a ray extending forward from each coxa, and a third from the abdomen, base and apex of the first two abdominal segments, 4 anterior coxæ and trochanters, stripe on posterior coxæ above and second joint of posterior trochanter, yellowish-white. Posterior coxæ and first joint of trochanter black; posterior tarsi dusky at tips; remainder of legs honey-yellow. Antennæ black, fulvous toward the tip. Wings hyaline, infumated at the apex; areolet small, petiolate. Entire thorax coarsely, but not closely, punctured. Abdomen smooth, shining.

Described from 2 ♀♀ collected at the Michigan Agricultural College.

MENISCUS MICHIGANENSIS, n. sp.

♀. Length, 10 mm.; ovipositor, 8 mm. Black, with yellow markings; abdomen beyond second segment rufous. Broad orbital lines, entire front, scape beneath, annulus on antennæ, mouth except tips of mandibles, gula, entire prothorax, tegulæ, line beneath, large triangular spot in front confluent with a cuneiform line on mesonotum, extending back nearly to the scutellum, venter except anterior part of mesosternum, with a continuation of the same on to the pleuræ, ending in a large hook beneath the wings, metapleuræ and two lines above joining posteriorly, base, apex and a large spot in the centre of the first abdominal segment, base and apex of second segment, connected by a longitudinal line, lemon-yellow. Posterior femora rufous; 4 posterior trochanters black at base, and coxæ with black stripe above; 2 hind coxæ black inside; extremity of posterior tibiæ, and basal joint of tarsi, except tip, black; remainder of legs lemon-yellow. Wings hyaline without areolet. Antennæ brown, black above. Thorax and face coarsely, but not closely, punctured. Abdomen smooth, shining.

Described from 1 ♀ taken at the Michigan Agricultural College.

? MENISCUS JOHNSONII, n. sp.

♀. Length, 11 mm.; ovipositor, 1.5 mm. Black, with yellowish-white markings, as follows: Entire head, except occiput, spot enclosing ocelli and antennæ, narrow central line beneath, reaching to clypeus, and tips of mandibles; prosternum; mesothorax with two cuneiform lines on margins of mesonotum, two stripes in front of scutellum, scutellum except posterior part and spot in front, two spots beneath primary wings and

Digitized by Google

another in front of middle coxæ, posterior part of mesosternum; metathorax with a transverse row of 5 spots across the anterior part and 3 across the posterior part; abdomen with first segment to spiracles and a short line in centre beyond, broad band at base of second and third segments, narrower band at base of succeeding segments and entire venter. Antennæ wanting. Legs honey-yellow, except 4 anterior coxæ beneath, which are whitish, joints 3, 4 and 5 of middle tarsi, which are dusky, and apical third of posterior tibiæ and basal fourth of first tarsal joint, which are black. Wings hyaline, somewhat infumated around the apical margin; areolet wanting. Entire thorax punctured, metanotum rugose. Abdomen somewhat clavate, smooth and polished.

Owing to the short ovipositor and shape of abdomen, this species will probably belong to a new genus, and is only temporarily placed here.

Described from 1 specimen taken at Jamesburg, New Jersey, by Mr. Chas. W. Johnson, to whom I take pleasure in dedicating this species, as a slight token of thanks for the many valuable specimens of Ichneumonidæ sent me.

NEW SPECIES OF TENTHREDINIDÆ, WITH TABLES OF THE SPECIES OF STRONGYLOGASTER AND MONECTENUS.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The following descriptions are offered, preparatory to publishing a list of the saw-flies of the Upper Cayuga Lake Fauna. The types are in the Entomological Collection of Cornell University.

Caliroa, Costa.

Caliroa Nortonia, n. sp. Body entirely black, head finely, densely punctate, clypeus emarginate, antennæ black, broad, of the same width throughout, third segment one-third longer than fourth, fourth and fifth subequal in length, sinus each side of the ocelli reaching the back of the head, from each side of the lateral sinuses there is another sinus starts off behind the posterior ocelli, crossing back of the median ocellus and running down each side of this ocellus for a short distance, where it becomes obsolete; tegulæ and collar very narrowly dull white, thorax and abdomen glossy black; legs white, coxæ, trochanters, basal half anterior and basal two-thirds of middle and posterior femora black,

Digitized by Google

posterior tibia with a band at apex, and posterior tarsus except base of metatarsus, brown; wings hyaline, veins and stigma black, costa at immediate base white, first submarginal cross-vein distinct. Length, 7 mm.

Habitat—McLean, N. Y. 1 ♂ 30th May, 1890.

This species is readily separated from *obsoleta* by the crossing sinus on the front, the colour of the femora, and the larger size. The species is dedicated to Mr. Edward Norton, the well-known student of American Tenthredinidæ.

STRONGYLOGASTER, Dahlb.

1. Lanceolate cell with a cross-line ..... 2.
   Lanceolate without a cross-line ..... 15.
2. Under wings with incomplete outer cells; if complete, no cross-vein in cell in front of lanceolate cell ..... 3.
   Under wings with complete outer cells, and with a cross-vein in cell in front of lanceolate cell ..... *pinguis*, Nort.
3. Antennæ in part pale ..... 4.
   Antennæ wholly black ..... 9.
4. Antennæ pale at apex ..... 5.
   Antennæ pale at base ..... *epicera*, Say.
5. Head testaceous ..... 6.
   Head black ..... 7.
6. Median lobe of mesothorax black, margined with white ..... *mellosus*, Say.
   Median lobe of mesothorax rufous ..... *terminalis*, Say.
7. Eyes margined before and behind with black ..... *apicalis*, Say.
   Eyes margined with white or rufous in part ..... 8.
8. Eyes margined before and behind with white .. *pallidicornis*, Nort.
   Eyes margined behind with rufous, black in front .. *rufoculus*, n. sp.
9. Lanceolate cell of posterior wings not attaining the margin, an appendiculate vein at apex ..... *abnormis*, Prov.
   Lanceolate cell attaining the margin, not with an appendiculate vein at apex ..... 10.
10. Eyes partly margined with white ..... *fidus*, Cress.
    Eyes wholly margined with black ..... 11.
11. All the coxæ and trochanters white ..... 12.
    Some of the coxæ and trochanters black or in part black ..... 13.
12. Scutellum black ..... *pallicoxus*, Prov.
    Scutellum white ..... *proximus*, Prov.

Digitized by Google

13. Abdomen entirely black..... ..... *rubripes*, Cress.
Abdomen transversely banded above with rufous or yellow.. . 14.
14. All the femora rufous.... ..... *rufocinctus*, Nort.
The femora in part black..... .... *tibialis*, Cress.
15. Antennæ pale at base..... *rufescens*, Nort.
Antennæ entirely black..... 16.
16. Thorax reddish-yellow..... *unicus*, Nort.
Thorax black..... ..... 17.
17. Abdomen wholly rufous..... *tacitus*, Say.
Abdomen in part black..... 18.
18. Abdominal segments two to four wholly pale..... 19.
Abdominal segments two to four in part black..... 24.
19. Coxæ wholly pale..... 20.
Coxæ entirely or in part black. ..... 21.
20. Scutellum black..... *pallicoxus*, Prov.
Scutellum white..... *proximus*, Prov.
21. Basal abdominal segment wholly black..... 22.
Basal abdominal segment not wholly black..... 23.
22. Femora black at base..... *annulosus*, Nort.
Femora rufous..... *luctuosus*, Prov.
23. Coxæ wholly black..... ..... *impressatus*, Prov.
Coxæ waxen-yellow at apex..... *longulus*, Nort.
24. Abdominal segments yellow at base and black at apex
.... *multicinctus*, Nort.
Abdominal segments black at base and yellow at apex, or with
only the two basal segments black..... 25.
25. Coxæ wholly rufous..... *soriculatus*, Prov.
Coxæ in part black..... ..... 26.
26. Abdomen with the two basal segments black..... 27.
Abdomen with the two basal segments not wholly black..... 28.
27. Legs waxen-yellow..... *longulus*, Nort.
Femora in part black at base; female with a whorl of hairs at
apex..... *pacificus*, MacG.
28. Abdominal segments finely margined with white..... *politus*, Prov.
Abdominal segments with the apical half testaceous or reddish-
yellow..... ..... 29.
29. Coxæ wholly black..... ..*annulosus*, Nort.
Coxæ pale at apex..... *distans*, Nort.

Digitized by Google

Strongylogaster rufoculus, n. sp. Head black, clypeus and labrum white, labrum broadly rounded, a prominent rufous spot behind each eye, antennæ black, segments six to nine white, the third segment one-third longer than the fifth, sinus at side of ocelli not reaching the back of the head; thorax black, the tegulæ rufous; apex of the abdominal segments slightly darker, basal plates black; legs rufous, coxæ black, posterior coxæ slightly marked with yellow, anterior and middle trochanters black, posterior yellow, femora and tibiæ rufous, posterior femora slightly marked with black at apex, tarsi yellow; wings slightly yellowish, veins brown, costa at base of stigma yellow, apex of stigma brown, lanceolate cell with an oblique cross-nervure, posterior wings with two middle cells, outer cells incomplete. Length, 11 mm.

Habitat—Ithaca, N. Y. 3 ♀ ♀, June 5–10, 1890.

Strongylogaster primativus, MacG., should more properly be referred to *Tenthredopsis*, having the cross-vein of the lanceolate cell perpendicular or wanting, and the third and fourth segments of the antennæ equal.

BIVENA,* gen. nov.

Wings with three marginal and four submarginal cells, the first marginal cell receiving the two anterior submarginal cross-veins and the second the third, the second and third submarginal cells each receiving a recurrent nervure, lanceolate cell open at the shoulder, subcontracted at middle with a cross-vein near the apex, subcosta wanting, posterior wings with two middle cells, the cross-vein closing the apex of the anterior one runs to the margin of the wing at about one-third the width of the cell, thence follows around the margin of the wing to the vein forming the posterior side of the cell; antennæ nine-jointed, filiform, reaching to about the base of the abdomen, the segments all of the same width, head as wide as the thorax, very slightly dilated behind the eyes; abdomen about as long as the head and thorax, somewhat widened at middle, ovipositor stout, of the usual type of Macrophya. Type, *Bivena maria*, sp. nov.

A very interesting genus, belonging to the subfamily Tenthredinæ. Easily separated from both the Lydiinæ and Xyliinæ by the absence of subcosta, from the former by the nine-jointed antennæ and from the latter in not having the ovipositor greatly exserted and the basal segments of the antennæ dilated.

*Bis, twice; vena, vein.

Digitized by Google

Bivena maria, sp. nov. Head black, with white on the anterior orbits, beneath the eyes, around the immediate base of the antennæ, a quadrangular spot between the antennæ, the clypeus, and the labrum; antennæ brownish-yellow, the third segment slightly longer than fourth, fourth and fifth subequal, clypeus truncate, sinus each side of the ocelli, reaching the posterior part of the head; the tegulæ, collar narrowly, the scutellum, cenchri, and apex of the basal plates, yellow; abdomen rufous, the basal half of the first segment and three apical segments, including the ovipositor sheath, black; legs yellow, the anterior and middle coxæ slightly at base, the posterior above and below, and the posterior tibia at apex, black; wings hyaline, veins brown, including the costa, stigma black, lighter at apex and behind. Length, 8 mm.

Habitat—West Danby, N. Y. 1 ♀, 31 May, 1890.

MONECTENUS, Dahlb.

1. Wings smoky; scutellum black; antennæ with thirteen segments ..... *fulvus*, Nort.
   Wings hyaline; antennæ with more than thirteen segments.... 2.
2. Lateral fulvous line of abdomen interrupted on the three or four basal segments; antennæ fifteen-jointed.... *suffusus*, Cress.
   Lateral fulvous line continuous from the base of the abdomen.. 3.
3. Antennæ fourteen-jointed..... *melliceps*, Cress.
   Antennæ sixteen-jointed..... *juniperinus*, n. sp.

Monectenus juniperinus, n. sp. Fulvous, with the following parts black: mandibles, antennæ, a lunate mark, including the ocelli, its horns reaching the antennæ; a broad dash on the lateral lobes, the scutellum, in some cases only its apex, metathorax, basal plates, tergum and venter except a lateral line, pectus, pleuræ except a dark fulvous spot, coxæ at base, and tarsi at apex; antennæ decidedly serrate beneath, with sixteen distinct segments; clypeus emarginate; wings hyaline, veins brown, caudal half of cross-vein between first and second submarginal cells hyaline, stigma brown, clearer at middle. Length, 8 mm.

Habitat—Ithaca, N. Y. Collected by Mr. R. L. Junghanns, a student in the Entomological Department of Cornell University. Described from four females, collected on Red Cedar (*Juniperus virginiana*).

Mailed November 3rd.

Digitized by Google

The Canadian Entomologist.

VOL. XXVI. LONDON, DECEMBER, 1894. No. 12.

SOME PSYCHODIDÆ FROM LONG ISLAND, N. Y.

BY NATHAN BANKS, SEA CLIFF, N. Y.

Thomas Say described one species of Psychoda from the United States; Walker described another from Hudson's Bay; and Dr. Williston, in Entom. News, 1893, described a third species from New York. I have noticed in the vicinity of Sea Cliff, N. Y., seven species, only one of which I have identified as previously described. Most of the forms I have collected are probably common elsewhere in the Eastern States and in Canada.

All the forms known to me appear to be congeneric and belong to Psychoda. They have two veins between the forked veins, more or less pointed wings, and the second longitudinal appears to arise beyond the first basal cell. Pericoma, I should consider to consist of species with rounded wings and the second longitudinal arising before the anterior cross-vein. But Eaton, in his paper on the British species, has placed other forms under it; however, from his diffuse table it would be almost impossible to obtain any idea of the characters of Pericoma. I think it much better to use the terminology commonly used in Diptera rather than adopt one taken from another order. The species from Long Island are almost identical in venation, presenting 10 principal veins ending in the margin. The small vein at base is the auxiliary vein. The first longitudinal is simple, the second forked near middle of wing, the third forked close to the base, the fourth forked near middle, the fifth simple, and the sixth or anal consists of two branches. The two small cells at base, I should call the first and second basal cells, each bounded by the usual veins. All the veins are nearly straight, and at about equal distances apart, and bear many hairs. There is a fringe all around the wing, but longest on the posterior margin. The legs appear to be about of the same length and shape in all the species. The antennæ vary in length, and in some species are thicker in the males than in the females. The males have a superior and inferior pair of appendages, which consist of two or three joints.

Digitized by Google

I desire to thank Mr. A. D. MacGillivray, for kindly acquainting me with Mr. Eaton's classification of the British species.

The species may be tabulated as follows :—

1 { Wings grayish 2
  { Wings blackish 4

2 { Black dots at tips of some veins ..... *alternata*.
  { No dots 3

3 { At least two millimeters long ..... *cinerea*.
  { Less than two millimeters ..... *minuta*.

4 { Black dots at tips of some veins ..... *superba*.
  { No black dots, wings without white hair except in fringe 5

5 { Two distinct median patches of erect black hair, thorax black, fringe around apex whitish ..... *marginalis*.
  { Wings evenly black, fringe not whitish ..... 6.

6 { Thorax white and with white hair ..... *bicolor*.
  { Thorax black and with black hair ..... *nigra*.

Psychoda alternata, Say.

Body nearly white or slightly yellowish, with white and grayish hair; wings thinly clothed with gray hair, indistinctly showing a pale band at middle and one near base; spots of black hair at tips of veins 6, 8, and 10, and usually at ends of 2, 3, and 4; the fringe of gray hair which on posterior margin is three times as long as the width of a cell. Legs pale with white hairs. Antennæ slender and short, not as long as breadth of wing, quite thickly clothed with whorls of white hair; wings moderately narrow, acute at tip. The ♂ genitalia consist of two pairs of appendages; the inferior pair very slender, and as long as the diameter of the tip of the body, approximate at base, gradually separating and then strongly curving toward each other near tip, clothed beneath with long white hair; the superior pair quite wide apart at base, about half as long and less slender than the inferior pair, but little curved and with only short hair. The ventral plate of the ♀ is yellow, nearly twice as long as broad, with an emargination behind as deep as the plate is broad, the rounded branches slightly diverging; the ovipositor scarcely twice as long as the plate, slender and a little curved. Length of wing, 2. to 2.2 mm.

Common in July, on windows and on shrubbery near buildings; Sea Cliff, N. Y.

Digitized by Google

Psychoda cinerea, nov. sp.

Thorax and abdomen with long gray hair, a tuft of black hair at base of wing; wings with gray hair and fringe, the latter on the posterior margin nearly three times the width of a cell; legs pale with long, gray, and short white hair, and black scales on the tarsi. Antennæ slender, a little longer than the width of the wing, base of joints blackish, each joint with a whorl of white hairs; wings about as broad as in *P. alternata*, acute at tip. The inferior pair of ♂ appendages is long, contracted in the middle, swollen beyond, then growing slender and curving upwards, clothed beneath with white hair; the superior pair much shorter and curved downwards near tip, they are quite suddenly swollen near the middle. Ventral plate of ♀ as broad as long, slightly emarginate behind and with short scales, the ovipositor quite prominent and slightly curved. Length of wing, 2.1 to 2.8 mm.

Common on windows during June and July; Sea Cliff, N. Y.

This species is readily distinguished from the preceding by its slightly darker colour and by the uniform wings.

Psychoda nigra, nov. sp.

Black, with dark brown on the thorax and long black hair on the abdomen, wings evenly and quite thickly covered with long black hair, and with a black fringe, which on the posterior margin is about five times as long as the width of a cell; legs black, with very long black hair on outside of the tibiæ at base. Antennæ slender and a trifle longer than the width of the wing, clothed with white and some black hair, giving them a grayish appearance; wings narrower than in *P. alternata*, and very acute at tip, the posterior margin near tip being almost concave. The ventral plate of the ♀ is blackish, not much longer than broad, broadest at base, and barely emarginate at tip; ovipositor more than twice as long as plate and slightly curved. Length of wing, 2.1 mm.

One female, captured on a currant-bush at Sea Cliff, N. Y. Separated from all the other species by its uniform black appearance.

Psychoda minuta, nov. sp.

Dark, with whitish hair on thorax and gray on abdomen; wings thinly clothed with gray hair and a gray fringe, which at the posterior margin is about twice as long as the width of a cell; legs dark with whitish hair. Antennæ not quite as long as breadth of wing, black at base of joints, and each joint in male with a dense whorl of white, appressed hair, which

Digitized by Google

gives the antennæ a very heavy and thick appearance; in the female the whorls are quite loose. Wings much broader than in the other species, and more blunt at tip. The inferior pair of ♂ appendages are very long, slender, and gradually tapering, strongly curved upward and nearly black, with white hair beneath, the superior pair not half so long, tapering and diverging. Cannot make out the structure of the ♀ ventral plate. Length of wing, 1.6 mm.

Not uncommon on the bark of large trees in a damp woods, but difficult to capture; near Sea Cliff, N. Y.

Readily known by its small size, uniform gray colour and broad wings, which, when at rest, are folded roof-like over the body.

Psychoda superba, nov. sp.

Black, the thorax clothed in the middle with black hair, and on the sides with snow-white hair, in some cases it appears to be all white-haired; the abdomen with long, dense, black hair; the wings with blackish hair and patches of erect white hair, the tips of the posterior veins with a black dot and a white spot between them, some of the anterior veins also usually tipped with a black dot; most of the fringe on the anterior margin is black, but near tip and on posterior margin, gray or whitish, where it is four times as long as the width of a cell; the legs are black, with black hairs and scales and a few white scales at the tips of the joints. The ♂ antennæ are black, quite thick, shorter than the width of wing, with short black and longer gray, appressed hair; in the ♀ the antennæ are more slender and more sparsely clothed. There are a few patches of white hair on the head. The wings are quite broad, but hardly as acute at tip as in some species. The genitalia are not prominent, being concealed by the long black hair of abdomen. The inferior appendages of the ♂ are black, approximate, short and blunt; they are not much more than one-half as long as the diameter of the tip of the body, and but little up-curved; the superior pair are nearly as large, stout, and tapering to a point; they are wide apart at base, but curve toward each other. The ventral plate of ♀ is broad, yellow at tip, and broadly notched, but the notch is but one-half as deep as wide; the ovipositor is twice as long as plate and a little curved. Length of wing, 2.5 to 2.9 mm.

Common on the bark of large trees in woods. June. Sea Cliff, N. Y.

Digitized by Google

There is some variation in the arrangement of the white patches on thorax and wings; the legs and antennæ are wholly black, so I do not think it can possibly be a form of *P. Slossonæ*, Will.

Psychoda marginalis, nov. sp.

Black, head and thorax with white hair, but not very dense; abdomen with black hair, and often a small patch of white hair each side at tip; wings thinly clothed with black and gray hair, and some scattered white ones near base, two prominent patches of erect black hair just beyond the middle of the wing; the fringe dark gray, except near the tip on each side, where it is whitish, giving the appearance of a white margin to a black wing; it is very long, on the posterior margin nearly as long as the breadth of the wing; legs dark with gray hair. Antennæ slender, black, with whorls of gray hair, about as long as the width of wing; wings narrow, acute at tip. The inferior pair of ♂ appendages are long and slender; at first they are parallel, then they diverge and curve upward; they are clothed with fine black hair; the superior pair are very far apart at base, about two-thirds as long as the inferior pair, gradually tapering and but little curved toward each other. Length of wing, 1.8 to 2 mm.

Not uncommon on low herbage near the edge of a swamp. June. Sea Cliff, N. Y. All my specimens seem to be males.

Easily recognized by its general black colour, two black patches on wing, and the apical white fringe.

Psychoda bicolor, nov. sp.

Head and thorax yellowish-white, abdomen black, the former with white, the latter with black hair; wings with black hair, most dense toward base and on costa; fringe black or dark gray behind, where it is about three or four times as long as the width of a cell; legs black, with black hair; antennæ slender, slightly longer than breadth of wing, black, with whorls of dark gray hair; the wings are broader than usual, very oblique behind, and acute at tip. The inferior ♂ appendages are three-jointed, the basal joints nearly united, the second joint tapering and curved upward, about as long as the first joint, at tip with a short, recurved, pointed joint; superior appendages two-thirds as long; widely separated, curved downward, slender at tip. Length of wing, 2.4 mm.

Not uncommon in the same locality as *P. marginalis*; only males known to me. Distinguished by its general black colour, except white head and thorax.

Digitized by Google

A NEW PERICOPID AND SOME NEW ZYGÆNIDÆ FROM CUBA.

BY B. NEUMOEGEN, NEW YORK.

My esteemed friend, Dr. L. Gundlach, has left to me the task of describing several new Bombyces, which he discovered within the last few years in Cuba. Some of the specimens which are uniques, are, unfortunately, in such a poor state that a thorough description was well-nigh impossible. In one case I had to refrain entirely, on account of the dilapidated condition of the insect. All the types belong to the *Museo Cubano Zoologico de Gundlach*, lately acquired by the Spanish Government.

Daphne, nov. gen.

Head well developed. Eyes large, hairy. Clypeus indentated. Palpi prominent, outwardly curved. Antennæ large, bipectinate, tapering at tip. Legs scaled, the tibiæ well armed and with a large hairy tuft. Abdomen long, slender and tapering. Primaries nearly double as long as broad. Exterior and interior margins rounded. Subcostal nervure arcuated near apex. Median nervules equi-distant. Submedian parallel with interior margin. Secondaries, margins well rounded, 7-veined. Costal nervure curvilinear. The ornamentation is black and steel blue, the veins blackish. The genus is allied to *Gnophæla*, Wlk., and should stand at the head of the Pericopinæ.

Daphne cyanomela, nov. spec.

Head, prothorax and abdomen of bright orange colour. Palpi the same, with black edges above. Eyes and antennæ black. Anal tuft somewhat paler than abdomen. Legs grayish black. Thorax and wings rich metallic blue. Black costa and black broad marginal bands on both wings, reaching to centre of inner and anal margins respectively. Fringes grayish black.

Below the same as above.

Expanse of wings: 46 mm. Length of body: 15 mm.

Type, ♂. No. 131, M. C. Z. de G.

Phaio, nov. gen.

Head and eyes large. Tongue well developed. Antennæ long, bipectinate, somewhat tapering at tips. Front prominent, pilose. Thorax pilose, with large patagiæ. Primaries very long and well drawn

Digitized by Google

out, more than twice as long as broad. Costa nearly straight, but somewhat curved inwardly at centre. Apices pointed. Exterior margin slightly bent angles, and interior margin somewhat sinuous at centre. Secondaries small, about as broad as long, sharply pointed at apices, and well rounded at anal angle. Abdomen long and well developed, rounded at anus. Legs long and slender.

Phaio longipenuis, nov. spec.

Eyes whitish yellow. Head black. Antennæ shortly pectinated, black, the outer edge and tip being bright yellow. Above thorax and abdomen dark blue, and all wings of blueish-black, fringes concolorous.

Below, wings as above, with red basal dots. Abdomen blackish, with a very peculiar black shield fringed with white hair, and having a yellow lateral dot, covering area of two basal segments. Legs yellow, with exception of coxæ, which are red above and black below.

Expanse of wings : 48 mm. Length of body : 14 mm.

Type, ♂. M. C. Z. de G.

A very peculiar, and in its fresh state, undoubtedly a brilliant insect. I should place it in the Zygaenidæ, between *Illipula*, Butl., and *Ixylasia* Butl.

Cosmosoma Juanita, nov. spec.

The specimen is not very good, and the antennæ are entirely missing. Head and eyes black. Palpi yellowish. Thorax and patagiæ black, the latter with white edges. The slender abdomen above is bright red, with basal two segments and anal segment of black colour, with anal black tuft. Below, bright red, with exception of black anal segment and tufts. Legs red, with white stems at coxæ.

Wings, above and below, vitreous, with black nervules. A broad marginal black band on primaries, forming a large black apical space, and tapering off at angle. Small black marginal bands on secondaries.

Expanse of wings : 23 mm. Length of body : 8 mm.

It is to be regretted that the specimen is not in a better state, the secondaries being nearly entirely demolished. When fresh, it must be a beautiful little insect.

Type, ♂. No. 132, M. C. Z. de G.

It comes very near *C. selecta*, Herr. Sch., but is easily distinguished by the absence of the black discal spots on primaries, and the different ornamentation of the body.

Digitized by Google

SOME LITTLE KNOWN SPECIES OF ŒNEIS.

BY H. J. ELWES, COLESBORNE, CHELTENHAM, ENG.

On page 224 of CANADIAN ENTOMOLOGIST, Volume XXVI., Mr. Herman Strecker has some remarks on Chionobas, in which, I am glad to say, he supports my views, except in two points. First, with regard to the *subhyalina* of Curtis, I cannot conceive on what grounds he supposes that the description of *subhyalina* refers to *Erebia fasciata*, and as W. H. Edwards's suggestion that the example from Guenée's collection sent to me by Oberthur as the type of *subhyalina* is not really so, rests on no evidence whatever; I still maintain that *subhyalina* is the proper name for the insect hitherto called *crambis*, Freyer, found, as far as we know at present, from Newfoundland along the Labrador coast to Hudson's Straits and other parts of Eastern Arctic America. It has no resemblance to *Beanii*, Elwes, first sent out under the name of *subhyalina*, by Mr. Bean, and only taken near Laggan. With regard to *alberta*, Mr. Strecker had probably written his notes before seeing W. H. Edwards's further remarks on this species, on page 192 of the same volume. If he had seen the true *alberta*, I do not think he could have supposed that it is a variety or form of *chryxus*. The one species is found in May only, on the prairie; the other always in the mountains, in pine forest, or above timber line, and does not appear, as far as I know, before about the 20th June. One has a well-marked sexual patch on the forewing in the male, the other has no trace of it. The smallest specimens of *chryxus* are considerably larger than the largest of *alberta*. The colour is also totally different on both surfaces, so I can only suppose that Mr. Strecker has never seen *alberta*. I have now received more specimens, including several females, from Mr. Wolley-Dod, and though the variation in colour and number of ocelli is even greater than W. H. Edwards points out, there is not the slightest difficulty in separating any single specimen from any specimen of my large series of *chryxus* and *varuna*. With regard to the latter, a number of specimens sent by Mr. Wolley-Dod, also taken near Calgary, confirm my opinion that it cannot be separated from *Uhleri*, even as a local variety, for though the majority of the specimens have larger and more abundant ocelli than *Uhleri*, from Colorado, there are several which I could not distinguish without the labels. As a rule, however, the band on the under side of the hind wing is better marked in the northern than in Yellowstone or Colorado specimens.

With regard to the single female from Mount Graham, for which Mr. Strecker suggests the name of *Laura*, I can form no opinion whatever.

Digitized by Google

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

VI. The Endomychidæ and Erotylidæ of Ontario and Quebec.

These two families immediately follow the Coccinellidæ in our lists, and are evidently related to them in many respects, the former, perhaps, the more closely, especially in tarsal structure. In habits there are, however, wide differences, the Coccinellidæ, as already stated in a former paper, being chiefly aphidivorous, while the Endomychidæ and Erotylidæ are mostly fungivorous.

Taking up the groups separately, we may consider the Endomychidæ first. These may be defined as Coleoptera, usually rather small in size, less convex and more elongate than typical Coccinellæ, and differing also in having much longer antennæ, the last three joints of which form a distinct club. The tarsi are four-jointed, the third joint often minute and anchylosed to the fourth. The claws are simple, the first ventral segment without coxal lines; the elytra cover the dorsal segments and the wings are without long fringes. The larvæ of the more typical genera, such as *Epipocus* and *Aphorista*, are moderately elongate, only slightly convex, scaly above, the sides of the body with appendages as shown in the figure (fig. 53, larva; fig. 54, pupa of *A. vittata* after Smith). That of *Mycetæa* is, however, of a different shape, as shown by Westwood, who figures it as of elongate form, the segments with deeply incised sutures and armed laterally with numerous bristles, the terminal segment with about nine bristles along the hind margin.

Fig. 53.

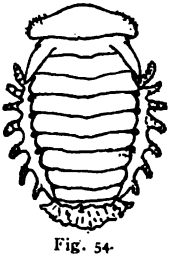


Fig. 54.

The Endomychid genera found in the provinces named may be thus known :—

A. Tarsi distinctly four-jointed; smaller species.

b. Body oval, pointed behind; surface pilose ..... *Mycetæa.*

bb. Body oblong, or subparallel; surface glabrous.

Elytra black, shoulders and apex red; thorax unspotted.. *Rhanis.*

Elytra reddish or yellowish, with two black fasciæ; thorax with black spot..... *Phymaphora.*

Digitized by Google

AA. Tarsi apparently three-jointed; larger species.

c. Thorax and elytra uniformly piceous-black above, except the obscurely ferruginous margin.....*Lycoperdina.*

cc. Thorax black, elytra red, each with 2 black spots.*Endomychus*

ccc. Thorax reddish, elytra black, each with two red spots.....*Mycetina.*

cccc. Thorax variable, elytra striped.

Above pubescent.....*Epipocus.*

Above glabrous.....*Aphorista.*

Only one species of each of these genera has been reported in the Canadian lists, but a short descriptive note is appended in order that should others be found they may be recognized as new to the fauna and accorded further study.

MYCETÆA, Stephens.

M. hirta, Marsh., occurs both in America and Europe. I have seen no specimens, but it is described by Stephens as being a rusty red insect of small size (about .06 in.), and oblong-ovate, convex form, the antennæ and legs pale dull red; the elytra are deeply sub-seriately punctured and pilose. It is found in fungi or on grassy banks.

RHANIS, Lec.

The only species, *R. unicolor*, Ziegl., is narrow, elongate, nearly glabrous, shining, about .14 in. long; the colour is reddish, the elytra black with the shoulders often indistinctly and the apex very broadly red.

PHYMAPHORA, Newm.

P. pulchella, Newm., is a beautiful little species; .15 in. long, elongate in form, the thorax red with discoidal black spot, the elytra reddish with two transverse black fasciæ, the anterior of which is very broad and nearly median in position, the other less distinct and nearly or quite apical. The male antennæ have an immense club.

LYCOPERDINA, Latr.

A neat piceous-black species, .19 to .21 in. long, the margin of the body and the legs more or less distinctly brownish-red, is *L. ferruginea*, Lec. It may be found under stones or logs early in the spring and on fungi later in the season.

Digitized by Google

APHORISTA, Gorham.

A. vittata, Fabr. (fig. 53, larva; fig. 54, pupa; fig. 55, beetle), is a smooth shining insect, about a quarter of an inch in length, in colour reddish above, the elytra with a common sutural black stripe, and each with a shorter lateral one. The antennæ are nearly black.

Fig. 55.

MYCETINA, Muls.

The little *M. perpulchra*, Newm., belongs here, and well deserves the name. It is .16 in. long, the head is black, the thorax red, either with or without a discoidal vitta. The elytra are black, each with two red spots, the anterior subhumeral in position and transversely elongate in form. This species is represented in fig. 56. *M. Hornii*, Cr., will doubtless be taken in British Columbia, and differs in having a triangular humeral spot.

Fig. 56.

EPIPOCUS, Germ.

Probably through error, the Texan *E. cinctus*, Lec., is in the Canadian lists. It is a large ferruginous pubescent species, .4 in. long, the thorax with four black marks, the elytra with the disk (except sometimes the sutural region) black. In Texas I have found it under logs near fungi and have described and figured the early stages, which resemble those of *Aphorista vittata*.

ENDOMYCHUS, Panz.

Fig. 57.

E. biguttatus, Say (fig. 57), has the thorax black, the elytra red, with two black spots on each, the posterior larger. Length, .16 in.

The *Erotylidæ* are allied to the *Endomychidæ*, but the tarsi are four or five-jointed, never three-jointed, as is apparently if not actually the case in the latter family. The pronotum has not the sub-basal transverse impression and two longitudinal lines so often seen in the Endomychidæ, and the form is usually more elongate and more convex. Comparatively little is known of the larvæ of our native species; that of *Languria* (fig. 58, *Languria Mozardi* in all stages) is elongate, and, in the species figured, about .32 in. long; the form is sub-cylindrical, only the anal segment being narrower than the preceding joint; the colour is light yellow, the mandibles and anal horns (which are acute and curved upwards) brown. It feeds in the stems of clover, and

Digitized by Google

may do noticeable damage. The larva of *Tritoma humeralis*, Fabr., is nearly white, the head yellowish, the form moderately elongate, nearly cylindrical, but tapering to each end, the ninth segment with two short, erect, slightly recurved hooks or processes; it lives in fungi, going under ground to pupate, remaining in this state eight days. The pupa is .20 in. long, very bristly and with a stout spine on the tip of the abdomen.

The genera are not in all cases readily separable by a beginner, being sometimes (as in *Tritoma* and *Mycotretus*) much alike in general form and appearance; however, a careful attention to the specific descriptions ought to do away with any doubt that may arise. The following table will show the points of difference in the Erotylid genera and enable those found with us to be recognized.

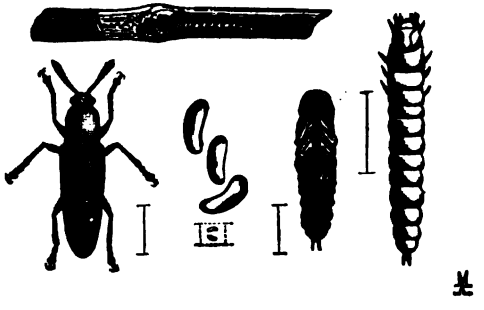


Fig. 58.

A. Form very elongate, parallel, front coxal cavities open... *Languria*.

AA. Form more robust, front coxal cavities entire.

b. Tarsi distinctly five-jointed.

Size small (.12 in.)..... *Dacne*.

Size large (.50–.80 in.)..... *Megalodacne*.

bb. Tarsi apparently four-jointed, the fourth joint very small.

c. Last joint of palpi widely securiform, thorax with black spots..... *Ischyrus*.

cc. Last joint of palpi oval or slightly triangular. Thorax unspotted.

Middle area of mentum large, transverse... *Mycotretus*.

Middle area of mentum small, triangular..... *Tritoma*.

LANGURIA, Latr.

The species of this genus are found under logs and stones early in the spring, later they may be swept from plants. Two species, one of which divides into two varieties, are known from our region.

Thorax red, elytra bluish or greenish (.22–.31 in.)..... *Mozardi*, Latr.

Digitized by Google

Thorax red with discoidal dark stripe (.35–.40 in.)...*gracilis*, Newm.
Thorax entirely greenish-black. .....*v. inornata*, Rand.

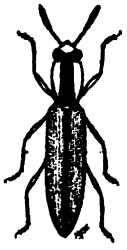


Fig. 59.

We give figures of *L. Mozardi* in all stages (Fig. 58) and the beetle of *L. gracilis* (Fig. 59). I have a specimen of *L. convexicollis*, Horn, with the label "B. C." It may be known from *L. Mozardi* by the larger size (.47 in.) and the entirely black under surface.

DACNE, Latr.

A small, black insect (*Dacne 4-maculata*, Say,) .12 in. long, the clypeus and a humeral and apical spot on each elytron reddish or yellowish, represents this genus. At times the apical spots may extend over the entire tip of the elytra.

MEGALODACNE, Crotch.

Two very fine species of this genus are found in Canada. They are large insects with black thorax, the elytra banded with black and orange-red in a manner recalling certain carrion beetles (*Necrophorus*), and are found in fungi. The two Canadian species resemble each other very closely, differing thus :—

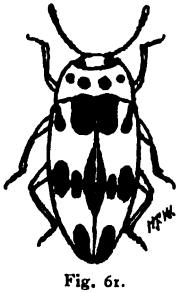


Fig. 61.

Smaller (.50–.60 in.). Elytra finely seriately punctate, thorax shorter... .....*fasciata*, Fabr.
Larger (.64–.80 in.). Elytra not punctate (Fig. 60).....*heros*, Say.

Fig 60.

ISCHYRUS, Lac.

I. quadripunctatus, Oliv. (Fig. 61), is about .30 in. long, black beneath, the side margins of thorax and abdomen marked with yellow or reddish. Above it is fulvous, the head black, the thorax with a series of four transverse spots across the middle, the elytra with black bands and spots as shown in the figure.

MYCOTRETUS, Lac.

Small red and black insects found on fungi or dead wood. Two species with one varietal form occur here and may be known thus :—

Thorax black, scutellum and elytra red (.16–.18 in.).*sanguinipennis*, Say.
Thorax and scutellum black, elytra bicolored.
Apical third of elytra obliquely black. (.14 to .16 in.)..*pulchra*, Say.
Black mark on elytra, angulate anteriorly.....*v. dimidiata*, Lac.

Digitized by Google

TRITOMA, Fabr.

Some of the species of this genus are very common in fungi during the summer and autumn; they resort to such places for the purpose of laying eggs which produce the somewhat maggot-like larvæ previously described. The beetles may be separated by the appended table :—

A. Entirely black above. (.16–.20 in.)..... ..... ***unicolor***, Say.

AA. Above bicolored.

b. Elytra with humeral reddish spot. (.10–.16 in.)..***humeralis***, Fabr.

bb. Elytra with broad, central, reddish-yellow band. (.18–.20 in.) ..... ***festiva***, Lac.

bbb. Elytra unicolorous, black or bluish, thorax reddish.

c. Body beneath reddish.

Antennæ entirely black, elytral interstices obsoletely punctulate. (.22 in.)..... ***macra***, Lec.

Antennæ black, red at base, elytral interstices very evidently though sparsely punctate. (.18–.20 in.)..... ***thoracica***, Say.

cc. Body beneath black. (.12–.16 in.)..... ***flavicollis***, Lac.

Fig. 62.

We give figures of *T. humeralis* (Fig. 62, the larva, and Fig. 63, the beetle). The last four species are of more elongate form.

Fig. 63.

The chief papers bearing on the North American species are as follows :—

1853. Leconte, J. L. Synopsis of the Endomychidæ of the United States. Proc. Acad. Nat. Sci. Phil., VI., pp. 357–360.

1854. Leconte, J. L. Synopsis of the Erotylidæ of the United States. Proc. Acad. Nat. Sci. Phil., VII., pp. 158–163.

1858. Gerstæcker, A. Monographie der Endomychiden, Leipzig, pp. xiv. + 433, 3 plates.

1873. Crotch, G. R. Synopsis of the Erotylidæ of Boreal America. Trans. Am. Ento. Soc,, IV., pp. 349–358.

1873. Crotch, G. R. Synopsis of the Endomychidæ of the United States. Trans. Am. Ento. Soc., IV., pp. 359–363.

Digitized by Google

A NEW ATTID SPIDER FROM JAMAICA.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

Saitis Annæ, n. sp.—Length 3½ mm.; width of abdomen, 1 mm. Cephalothorax, about as long as, but perhaps not quite so broad as abdomen. Abdomen broadly oval. Cephalothorax, about 1½ times as long as broad; broadest between 2nd and 3rd rows of eyes. General colour grayish brown, not metallic.

Cephalothorax with a broad black V, the truncate base of which corresponds to the base of the cephalothorax; and the arms extend forwards and outwards to the border between the latitude of the 2nd and 3rd rows of eyes.

Abdomen above with a black V-shaped mark on its posterior half, pointing towards its tip. In the V-mark of the cephalothorax, the arms become attenuate; but in this abdominal V-mark, the base is attenuate and the arms become greatly broadend towards their truncate ends. This V is bordered posteriorly on each side by a conspicuous patch of white hairs, and at the truncate ends of the arms, in striking contrast with the black, is on each side a white (or dirty white) patch, surrounded in front by a dark ring. On the side of the abdomen, below this patch, starts a whitish band, running forwards. Between the arms of the V are obscure markings which faintly indicate the arrow-head marks of such species as *Neon Nellii*, *Zygoballus Bettini* and *Hasarius Hoyi*. On the anterior half of the abdomen, the subdorsal region presents a band, bordered inwardly (dorsad) by whitish marks.

Legs ringed at intervals with blackish.

The terminal portion of the palpi is red-brown, becoming black at the end, but the middle portion bears a tuft of very conspicuous shining white hairs, which in certain lights appear yellowish-silvery. The front of the cephalothorax, below the eyes, also bears some silvery hairs; and there are whitish rings round the anterior eyes.

Middle eyes almost touching, outer eyes of first row almost touching them. Diameter of outer eyes about half that of middle eyes. Eyes of second row very small.

Sternum black, oval. Coxæ shining, translucent, hind coxæ close together.

Hab.: Manchester Cottage, Kingston, Jamaica, Feb. 26, 1893, among dead leaves. The type specimen is with Mr. Peckham.

Digitized by Google

I described this species when it was found, about 18 months ago, and named it after my wife. The description has remained in MS., as I expected that Mr. Peckham would publish the species, but he now states that he will not be writing on the group to which it belongs at present, and advises me to proceed.

This appears to be the third Attid recorded from Jamaica (the other two being *Anoka Peckhamii*, Ckll., and *Menemerus melanognathus*, Lucas, of which the former is endemic, but the latter cosmopolitan in the tropics), but possibly a dozen more have been collected, and will be described in course of time by Mr. and Mrs. Peckham.

P. S. to p. 284. Although it has nothing to do with the present subject, it will be well to mention here that the food-plant of *Tachardia cornuta*, Ckll., proves to be *Parthenium incanum*, H. B. K.

ENTOMOLOGICAL NOTES.

BY PROF. C. H. FERNALD, AMHERST, MASS.

In the CANADIAN ENTOMOLOGIST, Vol. 26, page 184, the Rev. Thomas W. Fyles described a moth as new, under the name of "*Botys urticaloides*." Mr. Fyles has been so kind as to lend me his type for examination, and it proves to be identical with *Metrea ostreonalis*, described by Grote in "Papilio," Vol. 2, p. 73, where he states that the type was taken by Mr. L W. Goodell, in Amherst, Mass., and that he also had a New York specimen in his collection. I have seen the Grote specimen, and also another one taken in Bangor, Maine, by Mr. Fred. Eddy. The habitat of the specimen in the National Museum, mentioned by Mr. Fyles, is not given, and perhaps is not known. It is, undoubtedly, a rare species at present, as these are all that are known to me.

The genus Botys (not Botis, as Swainson and some others have written it) was established by Latreille, in 1805, in his Histoire Naturelle des Crustaces et Insectes, Tome 14, page 230, under which he placed *purpuraria* and *potamogata*. The former of these species is a geometrid moth, and has been placed in Huebner's genus *Lythria*. The second species, *potamogata*, is not the species of Linneus by that name, but *stagnata*, Don.

In 1802, Schrank established the genus *Nymphula* in his Fauna Boica, with *potamogalis* as the type, but this has also proven to be *stagnata*, Don; therefore, the genus *Botys* of Latreille, if *purpuraria* be taken as the type, must be referred to the Geometridæ; but if *stagnata*, Don., be taken as the type, it must fall as a synonym of *Nymphula*, Schr. In either case we have no right to use it as a genus of the Pyralids, and for this reason I did not use it in Smith's List of the Lepidoptera of Boreal America, nor have Meyrick and Ragonot used it in their late works on the Pyralids.

Digitized by Google

LIST OF THE DRAGONFLIES OF CORUNNA, MICHIGAN.

BY D. S. KELLICOTT, COLUMBUS, O.

Corunna is the capital of Shiawassee County, in the central part of the Lower Peninsula, and approximately in 43° north latitude. The town is situated on the Shiawassee River, which traverses the county and enters the Saginaw, as a chief branch. At present there are very few permanent small streams and ponds in the vicinity, but a mill-dam across the river at the town causes sluggish, deeper water for a mile or more. This stretch of water is locally known as the "Pond." It abounds in aquatic life, thus affording the most favourable conditions for the nymphs of the "snake feeders." The collections on which this list is based were made about this "pond," and for a mile along the river below. The time of collection extends from June to September, and I feel confident that few species remain undiscovered. The list, therefore, fairly represents the Odonata of a favourable inland locality in Central Michigan.

It has occurred to me, again and again, how restricted many species are in their flight. In consequence, an abundant species of a given district may be wholly overlooked by the collector, if its special habitat is not discovered. For example, certain species occur almost exclusively at the "pond," others by the river, whilst still others are equally common in either situation. Thus, the emerald-eyed *Macromia Illinoiensis* is numerous about the rapids of the river, but is seldom seen at the "pond," whilst *Libellula incesta* is common at the latter, and as rarely seen by the former. Other illustrations will be given in notes under the several species.

The systematic arrangement followed is that of Philip P. Calvert, in the "*Catalogue of the Odonata of Philadelphia.*" The specimens are in the collection of the Ohio State University.

CALOPTERYX, Leach.

Maculata, Beauv.—Common in former years along the river and small streams. It is now seldom seen, owing, I think, to the draining of morasses and ponds, and the consequent drying up in summer of the meadow brooks.

Apicalis, Burm.—Rare, about the river.

HETÆRINA, Hagen.

Americana, Fabr.—Exceedingly abundant in August, by the river, especially where it flows rapidly over beds of bowlders and the margins are overhung by the long, coarse tussock grasses and the silvery sprays of the willow.

Digitized by Google

LESTES, Leach.

Unguiculata, Hagen.—Not uncommon.

Uncata, Kirby.—Common.

Disjuncta, Selys.—Less common than the preceding.

Rectangularis, Say.—Abundant.

Vigilax, Selys.—Fairly common.

Inequalis, Walsh.—Rare.

The first four species occur among the herbage of low lands and meadows, often long distances from the streams; the last two, on the other hand, are seldom seen away from the lily pads or bordering flags and rushes.

ARGIA, Rambr.

Putrida, Hagen.—Abundant.

Violacea, Hagen.—Abundant.

Tibialis, Rambr.—Not common.

Apicalis, Say.—Not common.

NEHALENNIA, Selys.

Posita, Hagen.—Not uncommon.

ENALLAGMA, Charp.

Civile, Hagen.—Few seen first week in August.

Ebrinus, Hagen.—Rare.

Divagans, Selys.—Common on the pond, resting on floating aquatics.

Exsulans, Hagen.—Abundant.

Signatum, Hagen.—Common. The last week in August it was the only abundant species of the genus.

ISCHNURA, Charp.

Verticalis, Say.—Exceeding abundant. The orange female is common.

HAGENIUS, Selys.

Brevistylus, Selys.—Common, July and August.

GOMPHUS.

No species of the genus has been taken in the locality; *G. vastus*, *exilis*, *fraternus* and *villosipes* are known to occur a few miles south.

DROMOGOMPHUS, Selys.

Spinosus, Selys.—Common in July; disappears about the 1st of August.

EPIÆSCHNA, Selys.

Heros, Fabr.—Not common.

Digitized by Google

FONSCOLOMBIA, Selys.

Vinosa, Say.—Rare. One taken July 31.

ÆSCHNA, Fabr.

Constricta, Say.—Abundant.

Clepsydra, Say.—Much less common than *Constricta*.

ANAX, Leach.

Junius, Dury.—Abundant.

MACROMIA, Rambur.

Illinoiensis, Walsh.—Common along the river and in open groves at considerable distances from the water.

EPICORDULIA, Selys.

Princeps, Hagen.—Common.

LIBELLULA, Linné.

Basalis, Say.—Very abundant.

Incesta, Hagen.—Common about the "pond" in July.

Quadrimaculata, Linné.—Rare.

Semifasciata, Burm.—Rare.

Pulchella, Drury.—Abundant.

PLATHEMIS, Hagen.

Trimaculata, De Geer.—Common.

CELITHEMIS, Hagen.

Eponina, Drury.—Not common.

LEUCORHINIA, Brittinger.

Intacta, Hagen.—Common.

DIPLAX, Charp.

Rubicundula, Say.—Very abundant.

Obtrusa, Hagen.—More abundant than the preceding.

Semicincta, Say.—Not common.

Vicina, Hagen.—Abundant.

PERITHEMIS, Hagen.

Domitia, Drury.—Not common about the "pond."

MESOTHEMIS, Hagen.

Simplicicollis, Say.—Abundant.

PACHYDIPLAX, Brauer.

Longipennis, Burm.—Abundant.

Digitized by Google

NOTES ON ALYPIA MARIPOSA.

BY JOHN B. LEMBERT, YOSEMITE, CAL.

Food plant.—*Clarkia elegans*, etc.

Egg.—Shaped like a white table squash without the scollops; usually laid on the flower buds, the young larva feeding inside on the parts of the flower; hatched in eight to eleven days.

First Stage.—Head bilobed, glossy black; body smooth, with a few fine bristles, when emerging dark on the upper side, which shade disappears, leaving the body a pale amber in a few hours; from the third segment the body slopes at an angle of forty-five degrees to the anal claws, which gives the third segment a humped appearance; the thoracic legs, six in number, are black; eight abdominal legs and two anal claws, the latter light with dark lines surrounding them. Length, 2 mm. This stage lasted three days, with one day more for moulting.

Second Stage.—Head bilobed, with a few bristles; colour black and glossy, with light marks appearing about the head; the body darker amber coloured, with pointed tubercles, each having a light-coloured bristle protruding from it; the thoracic legs black; legs and claws as in former stage. This stage lasted three days, with one more for moulting. The larva looped in both stages when walking, but ceased to do so in the next stage. Length, 3 mm.

Third Stage.—Head as before; a white, bell-shaped spot in the centre, with two narrow short bands on each side of the head, one over the mouth parts; a white line down the back, below this a dull dark band on each side, below these a white band, then a dark band running along the legs from the head to the anal claws; tubercles black, round and pointed at the tip, bristle light and fine, becoming longer in each stage; thoracic legs, abdominal legs and claws black. This stage lasted three days, with one day more for moulting. Length, 5 mm.

Fourth Stage.—Head bilobed, the white band joining over the centre of head above the bell-shaped spot; the rest of the body as in the former stage. This stage lasted three days, with thirty hours in moulting. Length, 9 mm.

Fifth Stage.—Head as before, the white band broader, more distinct and longer than the others in proportion; the first thoracic segment white with eight black round dots near the neck and a black narrow band back of the white, becoming yellow on the top of the segment, enough to cover four of the black dots, the body markings increasing in breadth, the white

Digitized by Google

bands on each side covering two longitudinal rows of tubercles; in the upper row a minute dot appeared in front of each tubercle, and two buff-coloured spots appeared in two upper dark longitudinal bands on the third segment, one on each side of the white line. Thoracic legs black, abdominal legs black, shielded on the outside; the claws have white and buff-coloured markings; the abdomen from the last pair of thoracic legs down the ventral surface to the claws has triangular joined markings; between the claws and abdominal legs are two lateral rows of short bristled tubercles, and between the abdominal and thoracical legs are two more rows. This stage lasted eight days, and three and three-quarters more for moulting. Length, 13 mm.

Sixth Stage.—Head and first segment as before; instead of dark longitudinal bands, irregular ovate, reniform and heart-shaped markings appeared on and between each segment; there were three wedge-shaped markings, one of them joining the other markings, altering their shape somewhat, with a wine-coloured surrounding about all these markings, there being two such rows on each side of the white dorsal band, a black line in the suture in front of third last segment and one in the suture above the claws, which are now of an amber colour with firm black line on the outer rims of the joints, the abdominal legs similarly marked and coloured, the posterior thickly marked with buff and white; instead of a dark band above the legs, there were three dots on each segment and above the legs some were single and others joined to resemble a heart form. The predominating colour white as the larva matured. This stage lasted seven and a-half days. Length in twenty-four hours after moulting, 24 mm.; when mature, 39 mm. At noon of the eighth day the larva ceased feeding, after evacuating all the solid food. Towards sundown it picked out a place to gnaw out a hibernaculum in rotten wood; finding its mandibles too tender for the work, the larva crawled up on the cork of the glass jar and rested for the night; about 8 a.m. it came down again on the wood to the place it had selected, and began steadily to work with its mandibles to excavate a round hole, and as long as it could the powdered material was raked out with its thoracic legs; afterwards, as the hole grew deeper, the powdered rotten wood was lifted up with the back of its head and neck by bending these in a hook form; by 1 p. m. the hole was complete; the larva then turned round and commenced to gnaw around the mouth of its hibernaculum, raking some inside, and then afterwards it formed a rim until it was just able to draw in its head, then the powdered wood was

Digitized by Google

lifted up, and with a mucilagenous matter the wood was mixed and cemented, and the mouth of the hibernaculum was sealed up by 2 p. m. As long as the seal was soft, the larva's efforts could be plainly seen keeping it up with its mouth parts. On the third and fifth day I found the larva was in the same condition as when it entered. On the seventh day I opened the hibernaculum further back—the larva had cemented the other places—and found that it was a larva still. On the tenth day, however, the larva had pupated.

Pupa.—Colour reddish-brown over the wing parts and abdomen ; over the head parts and upper and lower sides of the thoracic region, of a darker shade. The proboscis case prominent ; the neuration of the wings plainly visible. On each side of the abdomen are seven black round and raised spots, which are glossy white, the rest is finely granulated. Cremastral spines and a flattened area at the end of the abdomen, black. Length, 15 mm.

NOTES ON QUEBEC COLEOPTERA.

BY A. W. HANHAM, WINNIPEG, MAN.

These notes relate chiefly to species taken in the vicinity of Quebec City, all to species taken in the Province of Quebec during 1892–1893. I am greatly indebted to Mr. W. H. Harrington for the identification of many of the following :

Cicindela longilabris, Say. June 5 and 8. Fort woods, Levis.

Cicindela limbalis, Kl. (Two.) Aug. 28. Near Lake Beauport.

Cicindela hirticollis, Say. (One.) Aug. 28. Near Lake Beauport.

(*C. repanda*, *C. purpurea* and *C. vulgaris*, very abundant on this date.)

Cychrus Lecontei, Dej. Spring and Fall, abundant under dead leaves in damp woods. St. Romauld's, May 8, seven captured on wooded hill side. Gaspé Basin, May 14, a pair.

Carabus serratus, Say. Aug. 22. St. Joseph's de Levis. A pair under stones on hill side.

Blethisa Julii, Lec. May 10. One specimen in road near Fort No. 1, Levis. Aug. 13. Same locality, four, dug out of earth under thick, dry moss, edge of woods. Associated with this beetle were numbers of *Platynus cupripennis*, Say.

Digitized by Google

Notiophilus sibiricus, Mots? Aug. 13; Sept. 10, 17, 24; Oct. 30, etc. Isle d'Orleans. Under dead leaves, damp spots in woods; generally in pairs.

Trechus rubens, Fab. Oct. 15. Isle d'Orleans. A pair in dead leaves, edge of woods.

Pterostichus Luczotii, Dej. May 14. Gaspé. Several.

Cymindis cribricollis, Dej. May 15. Gaspé. Common at Quebec.

Brachylobus lithophilus, Say. (One.) Aug. 13. Fort woods, Levis.

Bradycellus cognatus, Gyll. (One.) May 20. Gaspé.

Quedius molochinus, Grav. May 8. St. Romauld's. Under dead leaves, wooded hill side.

Staphylinus fossator, Grav. (One). Aug. 10. Isle d'Orleans.

Choleva clavicornis, Lec. May 27. Isle d'Orleans. A few specimens in the shell of a dead *Mesodon dentiferus*, Birm.

Adalia frigida, Schn. Fall. Isle d'Orleans. One in dead leaves.

Cytilus trivittatus, Melsh. May 15. Gaspé.

Byrrhus americanus, Lec. June 8. Several in ruts of sandy road through open woods.

Campylus denticornis, Kirby. June 11. A small specimen, by beating, woods near St. David's.

Oestodes tenuicollis, Rand. One or two early in the year in the city.

Oestodes, sp. (perhaps *puncticollis*, Horn.) (One.) June 25. By beating, woods near St. David's.

Corymbites resplendens, Esch. June 11th. One specimen, living, under horse droppings on sandy road through woods, near St. David's.

Corymbites æripennis, Kirby. (One.) May 13. Isle d'Orleans. In dead leaves. Sept. 3. A pair under log near St. Joseph's.

Corymbites spinosus, Lec. (One.) June 11. By beating, woods near St. David's.

Corymbites triundulatus, Rand. May 18; June 11, etc. Fairly common.

Eros coccinatus, Say. (One.) June 11. By beating, woods near St. David's.

Geotrupes Egeriei, Germ. Isle d'Orleans. Aug. 30. Burying around fungus. Sept. 10, 24, and Oct. 1. Very abundant, crawling across road through woods, or resting in the sun.

Geotrupes Blackburnii. Fab.? Aug. 10. Isle d'Orleans. Several in manure.

Digitized by Google

Hoplia trifasciata, Say. June 11. Plentiful on blossom, woods near St. David's.

Rhagium lineatum, Oliv. June 11. One specimen off pine stump, same locality.

Anthophilax malachiticus, Hald. Isle d'Orleans. A dead specimen picked up in woods, May 26.

Achmæops pratensis, Laich. June 11, etc. In great variety and abundance, by beating off blossom.

Leptura zebra, Oliv. (One.) July 16. By beating, woods near St. David's.

Leptura chrysocoma, Kirby. June 25; July 9, 13, etc. This handsome "long-horn" is often to be met with on the flowers of *Chrysanthemum leucanthemum*.

Leptura proxima, Say. July 16. By beating, woods near St. David's.

Leptura vibex, Newm. June 11. A few by beating, woods near St. David's.

Saperda cretata, Newm. Aug. 6. Isle d'Orleans. One specimen off thorn.

Adimonia rufosanguinea, Say. May 18. Gomin swamp. Very common, by beating off blue-berry blossom.

Chelymorpha argus, Licht. Conspicuous, hibernating in dead leaves spring and fall.

Phellopsis obcordata, Kirby. May 8. St. Romauld's. Seven taken from under bark of rotten stump. May 18. One example at Gaspé Basin.

Cephaloon lepturoides, Newm. June 11. Abundant by beating off blossom of wild black cherry, woods near St. David's.

Schizotus cervicalis, Newm. (One.) June 11.

Pomphopœa Sayi, Lec. June 11. Woods near St. David's. Several off blossoms of wild black cherry (*Prunus serotina*, Ehrhart.) June 12. One on wing, Isle d'Orleans.

Hormorus undulatus, Uhler. June 11. Woods near St. David's. One specimen off blossom of choke-berry (*Pirus arbutifolia*).

Otiorhynchus rugifrons, Gyll. May 20. Gaspé. Hibernating.

Phytonomus nigrirostris, Fab. (One.) May 18. Gomin swamp Beating off blue-berry blossom. Also found hibernating.

Macrops sparsus, Say. May 20. Gaspé. Hibernating.

Digitized by Google

ON THE GEOGRAPHICAL DISTRIBUTION OF SOME COMMON SCALE INSECTS.

BY L. O. HOWARD, WASHINGTON, D. C.

Owing to the extensive commerce in nursery stock and fruits, which has been carried on all over the world for many years, it has become a matter of very considerable difficulty to form any adequate idea of the original Coccid fauna of any given part of the globe. Restriction of the importation of diseased nursery stock and fruit is new, and for years plants and fruit, carrying thousands of scale insects, have been landed almost daily at most large seaports. It is, however, not too late to ascertain many facts of importance, and since the apparent confusion is growing worse day by day, it becomes necessary to make an immediate endeavour not only to ascertain the original home of all species of economic importance, but to place on record all the facts which can be ascertained regarding their spread down to the present time. Many injurious species are still more or less restricted, and the necessity for quarantine laws is as great as it has ever been. If horticulturists will not demand, for their own personal good, a clean bill of health from dealers from whom they purchase plants, it behoves local and State governments to pass such regulations as will effectually prohibit the introduction of new insect enemies, particularly of this class of scale insects.

To point this moral to which I have more particularly referred in No. 3 of Vol. VII. of Insect Life, we have only to glance at the history of several prominent orchard scales, now more or less well-known to most fruit growers.

The Oyster-shell Bark-louse of the Apple (*Mytilaspis pomorum*, Bouché).—This widespread species, now found practically all over the world, so far as our information goes, was apparently originally a European species, at least it was known to European entomologists in the early part of the eighteenth century. At the present day it occurs abundantly throughout the United States and Canada, with the exception of the far south-west. It was imported into the New England colonies at some time during the last century. The first American account of the insect was written by Mr. Enoch Perley, of Bridgeport, Maine, in 1794. By 1835 it had spread through New England; in 1854 it was already abundant throughout New York, Pennsylvania and Ohio, and parts of

Digitized by Google

Wisconsin, but at that date had not penetrated farther west than the districts bordering upon Lake Michigan. It reached northern Illinois about 1852, and then spread gradually westward and southward, reaching the Mississippi River in the early '60's. In 1868 it had invaded Iowa and Northern Missouri; in 1872 it had extended south from Missouri into Mississippi and had made sporadic appearances in Georgia, towards which point it had, in the meantime, been spreading down the Atlantic coast. In 1872 it had also made its appearance in Eastern Kansas, and since that date it has appeared in Washington, Oregon and British Columbia, south to some extent in California, and in several of the fruit-growing regions of Colorado and Nebraska. At the present time it is seen in Nebraska, and is not known, so far as our information goes, in Louisiana and New Mexico.

Can Canadian entomologists trace its spread through the Dominion?

The Scurfy Bark-louse (*Chionaspis furfurus*, Fitch).—Unlike the preceding species, the scurfy bark-louse is a native of America. It occurs from Maine to Nebraska, through all the northern States, and south nearly to the Gulf of Mexico. Recently it has been imported into England on currant bushes from America. It is a hardy species, but coming into more or less direct competition with the oyster-shell bark-louse, it has, in many localities, been supplanted by the latter. Does this insect occur abundantly in Canada, and what is its Canadian distribution?

The Greedy Scale (*Aspidiotus camelliæ*, Sign.).—From our present information, it seems probable that this insect is indigenous to Southern Europe. It is known also in New Zealand, Australia and the Sandwich Islands, into which countries it was probably imported directly or indirectly from South Europe. In the United States it was first found in California, where it was probably introduced from Australia, and where it was first known in the vicinity of Santa Barbara, from which point it has spread north to Washington, and south to Mexico. From California it has been introduced into New Mexico. It is also found occasionally on hot-house plants in the north-eastern States, and rarely out of doors in Florida. In the latter State it has been found upon one food-plant only, and it is impossible to surmise whether this is the result of a direct importation from California or from Europe.

The so-called English Walnut Scale (*Aspidiotus juglans-regiæ*, Comstock).—For all we know to the contrary, this species is indigenous to the United States. It occurs in California, New Mexico, Florida, Texas,

Digitized by Google

Louisiana, Mississippi, District of Columbia and New York. In its more northern localities it is scarce. In the south, where attention has only recently been drawn to its injuries, it multiplies rapidly, and becomes a serious enemy to the peach and pear.

The New Peach Scale (*Diaspis lanatus*, Morgan & Cockerell).—This species seems to be indigenous to the West Indies, where it has been found in Jamaica, Trinidad, Martinique, Barbadoes, Santo Domingo and Grand Cayman. In the West Indies it occurs upon a great variety of food-plants. In Ceylon it has been found to affect cultivated geranium plants. In the United States, it is now known in one locality in Florida, another in Georgia, and in the District of Columbia, doing very considerable damage in each of these localities to peach trees. Its introduction from the West Indies into the United States is apparently rather recent.

The San José or Pernicious Scale (*Aspidiotus perniciosus*, Comstock).—This insect is known positively to occur in Australia, Chili and Hawaii, outside of the United States. In the United States it made its first appearance rather more than twenty years ago in the vicinity of San José, Cal. It was probably introduced at that point throngh importations of fruit trees and shrubs made by Mr. James Lick. Its original home is not yet known. The supposition that it is a Chilian insect, originally made by Mr. Alexander Crow, seems negatived by recent evidence, and it is probable that it reached Chili from the United States. It spread through California, reaching British Columbia within the last two years, and spreading eastward, it reached Idaho on the north, and Nevada, Arizona and New Mexico on the south, also within the last few years. A chance importation of California nursery stock has also established it at one point in Missouri, one in Florida, one in Virginia, one in Indiana, three in Maryland, two in Pennsylvania, one in New York State proper, and several in Long Island, and many in New Jersey.

The Red Scale of Florida (*Aspidiotus ficus*, Ashmead).—This scale is probably of West Indian or South American origin. For many years in the United States it was known only in the State of Florida, where it was introduced first into an orange grove near Orlando upon a sour orange tree brought from Havana, Cuba. Investigations made by Comstock in 1880 showed that it was an abundant species in the public gardens of the City of Havana. From the introduction at Orlando, the species spread rapidly through the orange-growing regions of Florida. Until recently it was supposed to have been introduced into Louisiana during the New

Digitized by Google

Orleans cotton exposition of 1884–5, but late investigations by Professor Morgan show that it is most prevalent in an orchard into which citrus plants from Brazil have been introduced, and that from this nursery nearly all the orange plants in the City of New Orleans have been sent out. This indicates a South American introduction into Louisiana independent of the West Indian introduction into Florida. Late advices show that it has established itself at Galveston Island, Texas. We have also seen specimens from Tampico, Mexico.

STAPHYLINUS CÆSAREUS, CEDERH., AND S. ERYTHROPTERUS, LINN., IN CANADA.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

Staphylinus erythropterus, Linn. This beetle has been but once recorded in America, the specimen being noted from Detroit. I have now to record it as inhabiting this section of Canada, and, at the same time, to correct an error which has been put in circulation through my agency. When Dr. LeConte visited me in July, 1883, he named a beetle for me as *S. cæsareus*, Cederh. (*ornaticauda*, Lec.), remarking that it has only once been found in America. The species was, therefore, inserted in my list of Ottawa Coleoptera (Ott. Field. Nat. Club, Trans.,vii., p. 191), and in my Additions to Canadian Lists of Coleoptera (Can. Ent. xvi., p. 46). These records are quoted by Dr. Hamilton in his catalogue of the Coleoptera common to North America, Northern Asia and Europe. The capture of examples of *S. badius* (not on my list) proved to me that a slip had been made by Dr. LeConte (his examination of my collection having necessarily been hurried), and that the insect labelled *cæsareus* was only really *badipes*. I, therefore, determined to strike the name off my list, and to take the first opportunity of correcting the error, but soon after, by a curious coincidence, I found (Apl. 23rd, 1892) under a stone at the margin of a swamp a Staphylinus, which seemed to be a genuine *cæsareus*. My determination was made by Dr. Horn's monograph of the genus (Trans. Am. Ent. Soc. vii., p. 191), in which, following the description of the species, he says :—"Easily known from every other species at present occurring in our fauna, by the spots of golden pubescence at the sides of ventral segments above and beneath." On informing Dr. Hamilton of my capture, he kindly sent to me a *cæsareus* from Europe for comparison. This was much larger, and had the elytra more pubescent, and the abdomen more coarsely sculptured and hairy, giving the beetle a coarse

Digitized by Google

facies. Still, the difference was not nearly so marked as the variations found in many of our beetles, and, relying upon the golden spots upon the abdomen as the test of the species, I remained of opinion that my insect belonged to it.

On October 27th last, Mr. Fletcher and I made a hunt in Dow's Swamp (near the Experimental Farm), on the borders of which I had found the specimen in 1892, and while digging around the roots of trees for such beetles as might have gone into winter quarters, it was my good fortune to obtain two specimens, and around the same stump were taken about a dozen examples of *badipes*. Both specimens when alive showed beautifully the golden spots on the abdomen, but when they were taken out of the bottle of sawdust, in which they were killed, it was found that the spots had mostly been rubbed off. With this new material I was anxious to definitely settle the question of species, and accordingly sent one to Dr. Hamilton, who replied that:—"The insect you sent is a good example of *S. erythropterus*. I have five examples of both *erythropterus* and *cæsareus* from Sweden, and there is no difficulty whatever in the determination by comparison. *Cæsareus* is much larger, and has the thorax and head much more coarsely punctured. The golden abdominal spots are about the same in both, but seemingly more readily lost in *erythropterus*, one half of mine having them about as in yours."

An early fall of snow prevented us from searching for more material until to-day (Nov. 17th), when I spent about two hours carefully searching in the swamp, which was very wet, and more or less covered with snow, and was rewarded by obtaining one specimen, also at the root of a tree under moss, etc., four or five inches beneath the surface.

The American record for *S. erythropterus* will, therefore, rest on the specimen from Detroit, U. S., and my four specimens from Ottawa, Can., the species being apparently able to perpetuate itself in this country, and inhabiting swamps.

The record for *S. cæsareus* will rest on Mr. Ulke's example taken in Canada (locality not quoted), and possibly that specimen, if re-examined, might prove to belong to the preceding species.

I regret that Dr. Hamilton's new edition of his catalogue is printed, and that, therefore, the records therein cannot be amended.

Digitized by Google

BOOK NOTICES.

THE BUTTERFLY HUNTERS IN THE CARIBBEES, by Dr. Eugene Murray-Aaron. New York, Charles Scribner's Sons, 1894. Pp. 269.

It is a novel event in literature to have a boy's book of adventure written by an Entomologist; we were, therefore, prepared to peruse with interest the volume which Dr. Murray-Aaron has just published. Belonging, perhaps, to those whom he characterizes as the "younger old people," we were charmed beyond measure with the book, and read it through from beginning to end with as much avidity and enjoyment as any adventure-loving school-boy. It relates in pleasant, easy style, the expedition made by a couple of boys, under the guidance of their naturalist friend, "the Doctor." During the early winter months they visited several of the islands of the Bahamas, and then made a more venturesome excursion across Haiti and into Santo Domingo, winding up with a flying visit to Jamaica. Their object was to collect butterflies especially, and at the same time to gather all the animal and vegetable curiosities that they conveniently could. For an account of their success and the various "dodges" they had recourse to, especially when in pursuit of *Papilio Homerus*, we must refer the reader to the book itself. It is not, however, a mere record of the doings of collectors; a great deal of interesting information is given regarding the condition of the negro races in their barbarism where left to themselves, and their happy condition when under British rule. Much pleasant instruction may also be gained regarding the geography, scenery and government of the various islands that were visited. If any paterfamilias is looking for a book to put in his boy's Christmas stocking, he cannot do better than purchase a copy of this. If his boy has any taste for Natural History, it will delight him beyond measure. The book is handsomely printed and bound, and illustrated with several well-executed plates. The entomologist may be disappointed at the absence of lists, or names of species, and pictures of butterflies; but the book is not meant for a scientific treatise, though its statements may be relied upon as strictly accurate, the author being well-known as the Editor for a time of *Papilio*, and Curator of the American Entomological Society, at Philadelphia, as well as a valued contributor to this magazine.

Digitized by Google

THE BUTTERFLIES OF NORTH AMERICA, by W. H. Edwards. Third Series, Part XV.

This part, like its immediate predecessor, is of especial interest to Canadian Entomologists, as it is chiefly devoted to the illustration of some of our most interesting species of butterflies, and more than maintains the very high standard of excellence to which Mr. Edwards has accustomed us. The first plate is devoted to two rare species of Argynnis from the Rocky Mountains of Alberta, the first being *Astarte*, for so many years practically unknown, save to those having access to the type in the British Museum, the locality whence it was received being even in doubt. True, it had been figured as to its upper side, in Doubleday, Hewitson & Westwood's great work "The Genera of Diurnal Lepidoptera," but that was not sufficient to identify it, so when it was re-discoveerd by Mr. Thomas E. Bean on the mountain summits near Laggan, it was very naturally re-described, or rather re-named, by Mr. Edwards, as *Argynnis Victoria*. The species is quite unlike any other North American species of this genus, and Mr. Bean's notes on its habits are very interesting. There is a slight clerical error in the reference to the plate in Doubleday's work, as it should be 23 instead of 53, as given by Mr. Edwards at the head of his article. The second species treated of is *A. Alberta*, a most distinct and interesting species belonging to the *Chariclea* sub-group, which also was discovered by Mr. Bean on the mountains near Laggan, in 1888. The sexes differ considerably in colour, and so far as known the imago only appears every second season, being found in the even numbered years.

The second plate is devoted chiefly to another butterfly discovered by Mr. Bean at Laggan, a species of *Chionobas*, which Mr. Edwards regards as identical with *C. Subhyalina*, Curtis, described in the Appendix to Ross's Narrative of his Second Voyage, the solitary type of which was taken in Boothia Felix. This identification, however, not being altogether satisfactory, and the species having been described by Mr. Elwes in the Trans. Ent. Soc., London, as *C. Beanii*, it will doubtless be known by the latter name.

In connection with this, it may be mentioned that the specimens in the British Museum collection, under the name *Subhyalina* are different from the form from Laggan, and seem to agree more closely with Curtis's description. A specimen from Hudson's Straits similar to those

Digitized by Google

in the B. M. is also in my collection. The other species figured on this plate is *Chionobas Norna*, well-known in Scandinavia, but of which Mr. Edwards has received several female examples from Alaska.

The male from Finland figured on the plate is certainly very different from the figure of that sex in Boisduval's "Icones," and the male is assuredly sometimes of the same type as the female, as shown by specimens from Norway in my collection.

The third plate of this magnificent part is an exceedingly fine one, crowded with figures illustrating *C. Semidea* from the White Mountains, Pike's Peak and Hudson's Strait.

The egg, young larva, larva after 1st moult and mature, and the chrysalis are fully illustrated.

The letter-press accompanying this plate extends to 11 pages, and is very full and interesting, though the author has apparently overlooked certain facts of interest, especially in connection with the discovery of an egg parasite of the genus Telonomus, as published in the Report of the Ent. Soc., Ontario, for 1892, pp. 32-35.

It is greatly to be hoped that the talented author will be able to carry on the third series of his grand work to twenty parts, as suggested in his "advertisement" to the current volume. H. H. LYMAN.

NORTH AMERICAN HEMIPTERA, by E. P. Van Duzee.

We desire to call the attention of those of our readers who are interested in this order to some recent publications by Mr. Van Duzee, viz., "A List of the Hemiptera of Buffalo and vicinity," and "Descriptions of some new North American Homopterous Insects," which were published in Vol. V., Part 4, of the Bulletin of the Buffalo Society of Natural Sciences; and "A Catalogue of the described Jassoidea of North America," which appeared in the Transactions of the American Entomological Society, Vol. XXI., pp. 245–317 (Philadelphia, July–September, 1894). These papers, which betoken much industry on the part of their able and enthusiastic author, are of especial value, inasmuch as so little work of the kind has been done in most of the families of the order that are found in North America.

Digitized by Google

INDEX TO VOLUME XXVI.

Acontia erastroides, larva of, 21.
Acrididæ of Indiana, 217, 241.
Acronycta cristifera, 141, 226.
" grisea, 124.
" impleta, larva of, 18.
" Radcliffei, larva of, 17.
Adalia, table of species, 302.
Adimonia cavicollis, 86.
Adonia constellata, 305.
Ægialia conferta, 202.
African moths, three new, 69.
Agallia constricta, n. sp., 90.
" *Uhleri*, n. sp., 91.
Agrilus acutipennis, 11.
" food plants of, 36.
Agrotis albalis, 103.
" cloanthoides, 103.
" docilis, 104.
" exsertistigma, 84.
" introferans, 269.
" murænula, 81.
" opipara, 82.
" perexcellens, 104.
" semiclarata, 104.
" Vancouverensis, 104.
Alypia mariposa, preparatory stages of, 348.
Anatis Rathvoni, 306.
" table of species, 303,
Andricus spongiola, n. sp., 235.
Angitia Americana, n. sp., 246.
Anisosticta strigata, 11, 229.
Anomala, table of species, 260.
Anthocharis, the genus, 47, 100, 166.
Anthonomus signatus, 272.
Anurida maritima, 165.
" Tullbergi, 165.
Aphis cucumeris, 266.
" mali, 147.
Aphodius, table of species, 203.
" troglodytes, 255.
Aphonus tridentatus, 261.
Aphorista vittata, 337, 339.
Aphoruridæ of Florida, 165.
Aphorura inermis, 165.
Aporia, neuration of, 168.
Aquatic larvæ and their parasites, 39.
Arachnis aulea, preparatory stages of, 307.
" suffusa " " 308.
Arctia ornata, 156.
Arctia rufula, 156.
Arenetra pallipes, n. sp., 250.
Argynnis Aphirape, var. Ossianus, 155.
" Aprodite, abundance of, 296.
" Chariclea, 119.
" Freija, 119.
" Frigga, 120.
" Polaris, 119.
" Triclaris, 155.
Argyria nivalis, life history of, 96
Artipus Floridanus, 256.
Ashmead, W. H., article by, 24.
Aspidiotus abietis, 190.
" affinis, 130.
" ancylus, 191.
" biformis, 131.
" camelliæ, 354.
" convexus, 287,
" dictyospermi, 128.
" ficus, 355.
" fimbriatus, 128.
" juglans-regiæ, 131, 354.
" " *var.* albus, 287.
" perniciosus, 269, 355.
" punicæ, 129.
Atænius, table of species, 203.
Ateloplus, n. gen., 182.
Athysanus anthracinus, n. sp., 136.
" *sexvittatus*, n. sp., 93.
Atlanticus, n. gen., 179.
" dorsalis, 180.
" gibbosus, 180.
" pachymerus, 180.
Attacus promethea, assembling of, 240, 296.
Attid spider from Jamaica, 343.
Audela acronyctoides, 124.
Aulocara Scudderi, 217.
Ausonides, neuration of, 167.

Baker, C. F., article by, 88.
Ballard, Mrs. J. P., death of, 234.
Banchus flavescens, 9.
Banks, N., articles by, 76, 88, 160 329.
Bean, T E., articles by, 155, 176, 238.
Bellura diffusa, 148.
" gortynoides, 85.
Belonuchus formosus, 254.
Bethune, C. J. S., articles by, 114, 115, 174, 294, 295, 358.

Digitized by Google

Beneficial insects : Smith, 295.
Bisulphide of carbon as an insecticide, 266.
Bivena, n. gen., 327.
" *Maria*, n. sp., 328.
Blatchley, W. S., articles by, 217, 241.
Bledius basalis, 254.
" fumatus, 254.
" punctatissimus, 254.
Blennocampa bipartita, larva of, 185.
Bolboceras Lazarus, 205.
Book notices, 27, 28, 52, 53, 111, 113, 147, 175, 294, 358.
Botys urticaloides, n. sp., 184, 344.
Brachyacantha ursina, 304.
Brachypeplus glaber, 254.
Brefos infans, 176.
British Museum collections, noctuæ in, 141, 226.
Buckell, F. I., article by, 238.
Butterflies common to Norway and Arctic North America, 117.
" from China, Japan and Corea : Leech, 113.
" of Copper Cliff, 12.
" of Kentucky, 289.
" of Laggan, 155.
" of North America: Edwards, 27, 359.
Butterfly hunters in the Caribbees : Murray-Aaron, 358.

Cacæcia semiferana, 126.
Cacopteris, n. gen., 181.
Caliroa Nortonia, n. sp. 324.,
Callichroma splendidum, 255.
Calotarsa, n. gen., 50, 88, 102, 116.
" *ornatipes*, n. sp., 52, 88, 102, 116.
Calvert, P. P., article by, 317.
Canthon, table of species, 201.
Carterocephalus Mandan, 11.
Caterva catenaria, 69.
Catocala cerogama, larva of, 21.
" retecta, larva of, 97.
Cenopis diluticostana, 126.
Centeterus Canadensis, n. sp., 210.
Ceratomegilla Ulkei, 305.
Chceretymna Ashmeadii, n. sp., 212.
Chelioxenis xerobatis, 255.
Chilocorus bivulneratus, 302.
Chionaspis furfurus, 354.
" major, 127.
" orthlopis, 189.
Chionobas, Alberta, 192, 224.
" Brucei, 176, 226.
" North American species of, 224, 236.
" Notes on a revision of the genus, 55, 133, 224.

Chloealthis conspersa, 222.
" curtipennis, 222.
Chramesus icoriæ, 280.
Chrysochraon viridis, 221.
Chrysopa oculata, 271.
Cicadula lepida, n. sp., 139.
Cicindelidæ of British Columbia, 153.
" of Lake Worth, Florida, 253.
" of Ontario and Quebec, 149.
Cingilia humeralis, 69.
Clinopleura, n. gen., 182.
Coccidæ, check-list of Nearctic, 31.
Coccidula lepida, 305.
Coccinella, table of species, 301.
" transversalis, 306.
Coccinellidæ of Dodge County, Wis., 87.
" of Ontario and Quebec, 297.
Coccus trifolii, 271.
Cockerell, T. D. A , articles by, 30, 31, 116, 127, 189, 284. 343.
Cœnonympha inornata, 238.
" typhon, 238.
Coleocentrus Pettitii, 11.
Coleoptera, additions to Canadian list, 48.
" notes on, 36.
" of Canada, 149, 197, 229, 259, 297, 337.
" of Copper Cliff, 15.
" of Fort Worth, Florida, 250.
" of Quebec, 350.
Colias Behrii, 156.
" Hecla, 118.
" interior, 176
" nastes, 176.
" palæno, 118.
Collecting season of 1893, 123.
Copidryas Platensis, 8.
Copris gopheri, 255.
" table of species, 201.
Coprophagous Coleoptera, table of genera, 199.
Coquillett, D. W., article by, 71.
Corthylus, species of, 277.
Cosmosoma Juniata, n. sp. 335.
Cossonus impressifrons, 254.
Cotalpa lanigera, 261.
Cremastochilus Harrisii, 255, 262.
Cremnodes Canadensis, n. sp., 213.
Crypticus obsoletus, 255.
Cryptolechia obsoletella, 126.
Cryptorhyncus lutosus, 256.
Cryptus flavipes, n. sp., 212
" *Vancouverensis*, n. sp., 211.
" *Victoriensis*, n. sp , 211.
Cyclocephala immaculata, 261.
Cynipidæ, new, 157.
Cynips Washingtonensis, n. sp., 235.
Cyrtogaster dimidiatis, n. sp., 26, 41.

Digitized by Google

Dacne 4-maculata, 341.
Dactylopius destructor, 271.
" *Solani*, n. sp., 286.
Daphne, n. gen , 334.
" *cyanomela*, n. sp., 334.
Dasylophia thyatiroides, 69.
Davis, G. C., article by, 321.
Dectidæ, review of N. American, 177.
Dendroctonus terebrans, 280
Desmocerus palliatus, 86.
Dialytes, table of species, 203.
Diaspinæ, scale insects of sub-family, 127, 287.
Diaspis cacti, 127.
" lanatus, 287, 355.
Dichelonycha, table of species, 230.
Dineutes assimilis, parasite from, 26, 39.
Dioryctria reniculella, 215.
Diplotaxis, table of species, 231.
Ditylus cœruleus, 11.
Dolichosoma foveicolle, 11.
Donacia distincta, 11.
" emarginata, 11.
" proxima, 11.
" subtilis, 11.
Dorycephalus platyrhyncus, n. sp., 216.
Dragon-flies of Corunna, Mich., 345.
" of Ithaca, N. Y., 76.
" of Nova Scotia, 317.
Drepanura, description of genus, 106.
Dryococtes, species of, 279.
Dryophanta glabra, n. sp., 237.
Dyar, H. G., articles by, 17, 42, 53, 65, 100, 185, 307.
Dytiscus Harrisii, 86.

Economic Entomologists, sixth annual meeting of, 265.
Edwards J., article by, 135.
" W. H., articles by, 3, 37, 55, 192, 234.
" W. H., reply to, 133.
Ehrmann, G. A., articles by, 69, 292.
Ellis, Carlyle, article by, 176.
Ellopia fervidaria, 125.
Elwes, H. J., articles by, 133, 336.
Emphytus Canadensis, larva of, 185.
" cinctipes, larva of, 186.
Enallagma, notes on species of, 76.
Endomychidæ of Ontario and Quebec, 337.
Endomychus biguttatus, 339.
Endropia duaria, 125.
Entomobryidæ, table of genera, 105.
Entomological trip to Copper Cliff, 9.
Ephialtes pacificus, n sp., 248.
" *Vancouverensis*, n. sp., 249.
Epilachna borealis, 297.
Epipocus cinctus, 339.
Epirrita dilutata, 124.
Erebia disa, 120.
" discoidalis, 9.
Eremopedes, n. gen., 181.
Eriococcus azaleæ, 271.
Eriopsis connexa, 305.
Erotylidæ of Ontario and Quebec, 337.
Errata, 116, 264, 316.
Euchætes sciurus, 156.
Euchloe, the genus, 47, 166.
Eudryas cypris, 8, 54.
" grata, 8, 54.
" shall we use the name? 309.
" timais, 310.
" unio, 8, 54, 309.
Euphoria, table of species, 261.
Eurytoma gigantea, 121.
Eutettix clarivida, n. sp., 138.
" *Johnsoni*, n. sp , 137.
Evolution and Taxonomy, 53.
Exartema versicolorana, 120.

Felt, E. P., articles by, 94, 96.
Fernald, C. H., articles by, 52, 344.
Fidia viticida, 273.
Field, J. A , article by, 296.
Fletcher, J., articles by, 22, 27, 111, 176.
Flowers and Insects, inter-relation of, Robertson, 111.
Fœnus, folded wings in, 146.
Formicomus scitulus, 255.
Fox, W. J., article by, 172.
French, G. H., articles by, 97, 293.
Fyles, T. W., articles by, 120, 184.

Gall on Mountain Cottonwood, 223.
Gausocentrus gyrini, n. sp., 25, 41.
Geotrupes, table of species, 206.
Gillette, C P., articles by, 157, 235, 239.
Glass tubes as incubators, 239.
Gnathotrichus, species of, 277.
Gnorimus maculosus, 262.
Grote, A. R., articles by, 1, 8, 54, 79, 103, 141, 215, 309.
Guignard, J. A., article by, 111.

Hadena evelina, larva of, 20.
" vulgaris, 125.
Hamilton, J., article by, 250.
Hanham, A. W., articles by, 294, 350.
Harmonia, table of species, 302
Harrington, W. H., articles by, 2, 9, 28, 86, 193, 209. 245. 356.
Harrington, W. H., election to Royal Society, 175.
Heath, E. F., article by, 208.
Hemileuca Californica, preparatory stages of, 293.
Hemiteles occidentalis, n. sp., 213.
" *piceiventris*, n. sp., 213.

Digitized by Google

Hemiptera, North American: Van Duzee, 360.
Hemiptera of Copper Cliff, 16.
" of New Mexico and Arizona, 312.
Herpestomus flavicoxæ, n. sp., 210.
Heterocampa thyatiroides, 69
Hibernia defoliaria, 22.
Hippodamia Americana, 306.
" falcigera, 306.
" mœsta, 305.
" table of species, 300.
Holcaspis maculipennis, n. sp., 236.
Holland, W. J., article by, 113.
Homolophus punctatus, n. sp., 164
Homoptera, new N. American, 89, 136.
Hopkins, A. D., article by, 274.
Hoplia, table of species, 230.
Howard, L. O., appointment of, 175
" " article by, 353.
Hubner's Exotic Butterflies, 175.
Hydræcia inquæsita, 126.
Hylesinus aculeatus, 280.
Hymenoptera, Canadian, 193, 209, 245.
" of Copper Cliff, 13.
Hymenopterous parasites from water beetles, 24.
Hyperaspis, table of species, 304. Hyperaspis undulata, 285.
Hypocryptus Vancouverensis, n. sp., 248.
Hyporhagus punctatus, 255.

Ichneumon occidentalis, n. sp., 210.
" *Taylori*, n. sp., 209.
Idiocerus amœnus, n. sp., 89.
Idionotus, n. gen., 182.
Insects and flowers, inter-relation of: Robertson, 111.
Insects at light, 295.
Ischyrus quadripunctatus, 341.

Jordan, Miss A. M., article by, 257.

Kellicott, D. S., article by, 345.
Kilman, A. H, article by, 48.
" " donation of coleoptera, 238.

Lachnosterna, table of species, 231.
Languria Mozardi, 339, 340.
" table of species, 340, 341.
Laphygma flavimaculata, preparatory stages of, 65.
Lee, C. L., article by, 295.
Læmbert, J. B., articles by, 45, 101, 156, 239, 348.
Lepidoptera, food plants of California, 45.
" notes on Nocturnal, 79, 103.
Lepidopterous larvæ, descriptions of, 3, 17, 24, 37, 65, 94, 96, 97, 257, 293, 307, 348.
Lepisesia Clarkia, 156.
Leptysma marginicollis, 221.
Lepyrus geminatus, 11.
Leucania pallens, 227.
" straminea, 227.
Leucarctia acræa, var. *Klagesii*, n. var., 292.
Ligyrus, table of species, 261.
Limenitis ursula, 123.
Lintner, J. A., Eighth Report on Insects of New York, 115.
Liobunum exilipes, 162
" *flavum* n sp., 164.
" *pacificum*, n. sp., 162.
" *parvulum*, n. sp., 163.
Listronotus setosus, 256.
Lithophane oriunda, 238.
" the species of, 79.
Lonnberg, E., article by, 165.
Lophoderus Mariana 126.
Lycæna exilis, notes upon 37.
Lycoperdina ferruginea, 338.
Lyman H. H., article by, 359.

Macgillivray, A. D. articles by, 105, 165, 169, 324.
Macrodactylus subspinosus, 231.
Macrops cryptops, 256.
Mamestra Dodgei 145.
" ferrealis, 145.
" lorea, 145.
" lubens, 141.
Marlatt, C. L,, article by, 265.
Mecynotarsus elegans, 255.
Megalodacne, table of species, 341.
Megilla maculata, 300.
Melanoplus bivittatus, 244.
" collinus, 244.
" griseus, 245.
Melolonthine Scarabaeidæ of Canada, 229.
Meniscus comptus, n. sp., 322.
" *Johnsonii*, n. sp., 323.
" *Michiganensis*, n sp., 323.
" *ostentator* n sp., 321.
" *Slossonæ*, n. sp., 322.
" table of species, 321.
Mesites rufipennis, 256.
Metrea ostreonalis, 344.
Miscellaneous Entomological papers: Webster, 147.
Moffat, J. A., articles by, 54, 123, 148, 238, 240, 281.
Monarthrum, species of, 277.
Monoctenus juniperinus, n. sp., 328.
" table of species, 328.

Digitized by Google

Monographie des Phycitinæ et des Galleriinæ: Ragonot, 52.
Monophadnus atratus, n sp., 193.
" synopsis of species, 193.
Monostegia quercus-albæ, 43.
" *quercus-coccineæ*, n. sp., 43.
Monotoma fulvipes, 255.
Moths' eggs, a method of securing, 156.
Mottled umber moth, 22.
Mycetæa hirta, 338.
Mycetina perpulchra, 339.
Mycotretus, table of species, 341.
Myriapodes des environs de Geneve: Alois Humbert, 114.
Mysia pullata, 303.
Mytilaspis albus, var. concolor, 190.
" pomorum, 271, 353.

Næmia episcopalis, 11, 300.
Nematoplus collaris, 11.
Nematus coryli, 44.
" monochroma, larva of, 187.
" salicis-odoratus " 187.
Neumoegen, B., article by, 334.
New Jersey, report of Entomological Department: Smith, 275.
Nicagus obscurus, 206.
Nothochrysa annulata, n. sp., 169.
" *Californica*, 171.
" *phantasma*, n. sp., 170.
Notolomus basalis, 256.
Nova Scotian dragon-flies, 317.
Nymphula potamogalis, 344.
" stagnata, 344.

Obituary, 234
Ochyria ferrugata, 173.
" spadicearia, 173.
Odonata of Corunna, Mich., 345.
" of Ithaca, N. Y., 76.
" of Nova Scotia, 317.
Odontæus, table of species, 206.
Œdemasia nitida, 125.
Œneis, notes on a revision of the genus: Elwes, 55, 133.
" Some little known species of, 336.
Oncocnemis viriditincta, 125.
Onthophagus, table of species, 202.
Opatrinus notus, 255.
Orchestes ephippiatus, 11.
" subhirtus, 11.
Orsodacna atra, 11.
Orthesia Annæ, 285.
Oryssus Sayi, 12
Osborn, H., article by, 216.
Osmoderma, table of species, 262.
Our Quarter Centenary, 1.
Oyster-shell bark-louse, 271, 353.

Pachnobia carnea, 83.
Pachypas Nasmythii, n. sp., 70.
Panthea propinquilinea, 125.
Papilio Asterias, variety of, 292.
" Cresphontes, 54, 123, 176.
" Machaon, 117.
" Turnus, variety of, 292.
" Zolicaon, life history of, 257.
Papirius olympius, n. sp., 110.
" *purpurascens*, n. sp., 109.
Parnassius Clodius, notes on, 101.
Paroxya Atlantica, 244.
Patton, W. H., articles by, 140, 146.
Pear-tree Psylla 271.
Pediopsis sordida, n. sp., 89.
Pelidnota punctata, 260.
Penthina impudens, 126.
Peranabrus, n gen, 181.
Peridroma incivis, larva of, 18.
Petrophora truncata, 124.
Pezomachus Keenii, n. sp., 214.
Pezotettix gracilis, 223.
" *obovatipennis*, n. sp., 241.
" occidentalis, 243.
" viridulus, 245.
Phaio, n. gen., 334.
" *longipennis*, n. sp., 335.
Phalangida of Washington, 160.
Phaleria longula, 255.
" picipes, 255.
" puncticeps, 255.
Phanæus carnifex, 201.
Phenacoccus helianthi, 285.
Philampelus achemon, 306.
Philhydrus simplex, 254.
Phlœosinus dentatus, 280.
Phlœotribus frontalis, 280.
Phobetes Canadensis, n sp., 248.
Phoxopteris apicana, 126
" Goodelliana, 126.
Phyciodes Carlota, preparatory stages of, 3.
" Ismeria, 6.
" Nycteis, 10.
Phycitid, an omitted. 215
Phymaphora pulchella, 338.
Pierinæ, sub-division of, based on pupæ, 214.
Pieris napi, 12, 118.
" oleracea. 123.
" rapæ, 118.
" the genus, 47, 100, 166, 214.
Pimpla inquisitor, 121.
Pityophthorus, species of, 278.
Platydema nitens, 255.
Platylabus pacificus, n. sp., 210.
Platynus Floridanus, 253.
Platypeza ornatipes, 88, 102, 116.
Platypus compositus, 275, 277.
" flavicornis, 277.

Digitized by Google

Platypus quadri lentatus, 275.
Platysamia Cecropia, 281.
" Columbia, 281.
" Gloveri, 282.
Plectromerus dentipes, 255.
Pleurophorus ventralis, 202.
Plusia, captures of, at Quebec, 294.
Polygraphus rufipennis, 280.
Polyphylla vario osa, 234.
Popular Science News, 175.
Proctotrypidæ of N America: Ashmead, 28.
" Winter habits of, 88.
Prout, L. B., article by, 173.
Psychoda alternata, 330.
" *bicolor*, n. sp., 333.
" *cinerea*, n. sp., 331.
" *marginalis*, n. sp., 333.
" *minuta*, n. sp., 331.
" *nigra*, n. sp., 331.
" *superba*, n. sp., 332.
Psychodidæ from Long Island, 329.
Psyllobora tædata, 306.
" 20-maculata, 303.
Pyracmon Vancouverensis, n. sp., 246.
Pyransta futilalis, 126.

Random recollections of Woodland, Fen and Hill: Tutt, 294.
Raphia frater, *var.* Coloradensis, larva of, 17.
Report of Entomologist and Botanist: Fletcher, 115.
Rhanis unicolor, 338.
Rhodites arefactus, n. sp., 157.
" *fulgens*, n. sp, 159.
" *neglecta*, n. sp., 158.
Ryncites cyanellus, 11.
Riley, Prof. C. V., resignation of, 174.
Rivula propinqualis, life history of, 94.

Saitis Annæ, n. sp., 343.
Salina, n. gen., 107.
" *Banksii*, n. sp., 107.
San José scale, 269, 355.
Sarrothripa Lintneriana, 125.
Scale insects, geographical distribution of some, 353.
" notes on, 189, 269, 284.
" of sub-family Diaspinæ, 127.
Scarabæidæ of Ontario and Quebec, 197, 259.
Science Gossip, 114.
Scolytidæ, sexual characters in, 274.
Scolytus, species of, 280.
Scudder, S. H., article by, 177.
Scurfy bark-louse, 354.
Selenophorus stigmosus, 253.
Semasia radiatana, 126.
Semiodes seminiger, n. sp., 247.
Semiothisa cæsaria, 124.
Serica, table of species, 231.
Sericoris albiciliana, 126.
Sheraton, W., article by, 317.
Silvanus rectus, 255.
Smicrips hypocoproides, 255.
Smynthuridæ, table of genera, 108.
Smynthurus minutus, n. sp., 109.
Snyder, W. E., article by, 87.
Spharagemon oculatum, 218.
Sphida obliqua, 85.
Spilosoma vestalis, 156.
Staphylinus badipes, 356.
" cæsareus, 356.
" erythropterus, 356.
Steiroxys borealis, 182.
" pallidipalpus, 182.
" trilineatus, 182.
Stewart, G. M., article by, 306.
Strecker, H., article by, 224.
Strigoderma arboricola, 260.
Stromberg, C. W., article by, 36.
Strongylogaster pacificus, 43.
" *rufoculus*, n. sp., 327.
" table of species, 325.
Strongylonotus, n. gen., 107.
" *Summersii*, n. sp., 107.
Synchloe lacinia, *var.* rufescens, 30.
Syntomis abdominalis, n. sp., 70.
" *Hilda*, n. sp., 69.
Syrphid, a very remarkable, 50.

Tachardia Cornuta, n. sp., 284, 344.
" larreæ, 285.
Tachys Columbiensis, 253.
Taracus pallipes, n. sp., 161.
Taylor, Rev. G. W., election to Royal Society, 175.
Tenthredinidæ, descriptions of larvæ, 42, 185.
" new species of, 193, 324
Tenthredo melanosoma, n. sp., 194.
" *nigrisoma*, n. sp., 195.
" *ruficollis*, n. sp., 195.
" *semirufa*, 10.
" Synopsis of species, 196.
Teratological trio, 86.
Tetragonderus intersectus, 253.
Tettix arenosus, 219.
" granulatus, 220.
Thamnotettix atridorsum, n. sp., 92.
Thyatira Anticostensis, 84.
Thysanura, North American, 105, 116.
Tomicus, species of, 279.
Tortrix pallorana, 126.
Townsend, C. H. T., articles by, 50, 102, 223, 312.
" resignation of, 175.
Triæna, on, 54, 116.

Digitized by Google

Trichiosoma triangulum, 11.
Trichius, table of species, 262.
" Texanus, 255.
Trimerotropis maritima, 218.
Triptogon occidentalis in Manitoba, 208.
Tritoma, table of species, 342.
Trogus Fletcherii, n. sp., 245.
Tropisternus glaber, 40, 41.
Trox, table of species, 207.
Truxalis brevicornis, 221.
Trypeta aplopappi, n. sp., 72.
" *araneosa*, n. sp., 74.
" *baccharis*, n. sp., 73.
" *Californica*, n. sp., 73.
" *cultaris*, n. sp., 72.
" *formosa*, n. sp., 71.
" *signifera*, n. sp., 73.
" solidaginis and its parasites, 120.
" *stelligera*, n. sp., 74.
" *tapetis*, n. sp., 75.
" *tortile*, n. sp., 71.
Tutt, J. W., articles by, 47, 166, 214, 226.

Valgus canaliculatus, 263.
Van Duzee, E. P., articles by, 89, 136.
Vanessa Antiopa, 11, 119.
" Atalanta, 119.
" cardui, 119.

Warner, Miss H. H., article by, 289.
Webster, F. M., article by, 117.
Wickham, H. F., articles by, 39, 149, 197, 229, 259, 297, 337.
Williston, S. W., article by, 116.
Woodside, Burnside, Hillside and Marsh: Tutt, 294.

Xyleborus, species of, 275, 278.
Xylina, notes on species of, 79.
" Oregonensis, preparatory stages of, 67.
Xylomiges confusa, 124.
" simplex, larva of, 21.
Xyloryctes satyrus, 261.
Xyloterus, species of, 275, 278.

Zethus Aztecus in Florida, 140, 172.
" Poeyi, 140, 172.
" Slossonæ, 140, 172,
Zygænidæ, new, from Cuba, 334.

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google